

# LAW <sup>10</sup> AND ORDER

Vol. 4

No. 1



## Special Police Radio Issue

AN INDEPENDENT, PROFESSIONAL MAGAZINE FOR ALL CONCERNED WITH THE BUSINESS OF LAW ENFORCEMENT



# BREAKING BOTTLENECKS AUTOMATICALLY

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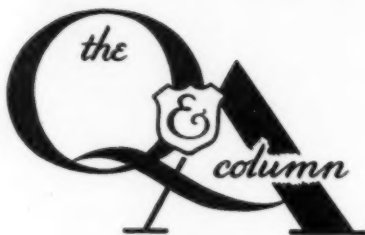
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EASTERN INDUSTRIES, INCORPORATED  
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Compiled by

**John I. Schwarz,**

Chief of Police, Easton, Penna.

# LAW AND ORDER


AN INDEPENDENT, PROFESSIONAL MAGAZINE FOR ALL CONCERNED WITH THE BUSINESS OF LAW ENFORCEMENT

Vol. 4

January, 1956

No. 1

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### ABOUT THE COVER:

This month our editorial matter accents Police Radio Communications. Pictured on our cover is Communications Officer John S. Freyland of the Clifton (N. J.) Police Dept. The equipment shown is manufactured by Federal Telephone and Radio Company.

WILLIAM C. COPP, Publisher  
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BRUCE HOLMGREN, Contributing Editor  
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- Q. A defendant elects not to take the witness stand. Now why can he not be held for contempt of court?
- A. It would be a violation of his Constitutional rights, and he cannot be forced to testify against himself.
- Q. Why do you think that a defendant would not want to take the stand in his own behalf, if he had the opportunity?
- A. The fear of cross examination.
- Q. Why would one defendant testify against his accomplices in crime?
- A. In the hope of clemency and leniency for himself.
- Q. What is meant by pleading surprise?
- A. If a witness testifies absolutely contrary to what was expected, with the permission of the court, the prosecution or the defense may cross examine their own witness, a procedure which is ordinarily prohibited.
- Q. What is an infant?
- A. A person who is under the age of 21 legally.
- Q. Can an infant legally testify under oath in court?
- A. Yes, if they are in a position to comprehend the difference between truth and untruth.
- Q. What is the age limit at which a child can testify?
- A. There is no set age limit. It is up to the court to determine from an examination whether or not the child clearly comprehends between truth and falsehood and understands that it is his duty to tell the truth.
- Q. Why are a defendant's religious or political beliefs not subject to comments by the Judge or District Attorney?
- A. By the act of April 23, 1909, PL #140, it is prohibited, due to the fact that it might cause prejudice against his case.
- Q. A witness in court states that he does not believe in any Supreme Being, but offers to take an oath and states that it will be binding on him. May he testify?
- A. Yes, he is qualified and should be sworn.
- Q. What do you mean by "Cross Examine?"
- A. As opposed to Direct Examination, it is the questioning or examination  
(Continued on Page 27)





**Governor of Indiana**

### **What Is Security?**

Most of us desire to achieve as full a measure of success and happiness in life as we can. I chose the law profession. Many men of my acquaintance have invested in law enforcement careers as a means of attaining their goal. All of us want security for ourselves and our families. But, it seems to me, we sometimes lose sight of the real meaning of security.

I believe that security, both for the individual and for the group, comes only as a result of the capacity and the willingness to produce a service or a good that other people want. There is, in the final analysis, no security for any man who does not make himself useful to his fellow men.

## **GUEST EDITORIAL**

### **George N. Craig**

To say it another way, man's security is directly proportional to his own resourcefulness.

A man who is employed in a useful occupation should be getting more than "a living" out of it. Every useful occupation, no matter how menial it is regarded, is a classroom. Ask yourself: Am I learning something from my job that helps my organization progress? Do I know more about my work, and its relation to the whole business, than when I began?

What each of us gets out of our job will be measured by the intelligent thinking we put into it. If a police department moves forward through the enterprise of its employees, then the lot of the individual employee will also be improved.

Progress is essentially the result of teamwork, of individual employees who, believing in their own skills and in their organization's objectives, work together. Anent loyalty, Elbert Hubbard once observed: "If you work for a man, in heaven's name work for him. If he pays you wages that supply you your bread and butter . . . speak well of him, stand by him, and stand by the institution he represents."

These, then, are the elements of security—service to others, initiative, vision, loyalty, and intellectual, cultural and moral stature. They provide the only real security.





## Radio Communications In Police Work

**C**OMMUNICATIONS ARE THE heart of any police department, and definitely, every Law Enforcement Agency should fortify and strengthen their respective departments with the use of all practical police communications. Before the advent of radio for police use, the only means of communications for alerting and locating needed policemen was through the use of the so-called flashlight signal and call box systems. Those with long experiences and service in police work can well remember this only means of locating a foot Patrolman with orders to respond to an assignment, where he would arrive in many instances, after the termination of the disturbance or other incident, and could only gather such evidence and testimony as he could procure from witnesses.

With the advent of radio, the policemen are usually on the spot during the disturbance or incident, providing themselves with on-the-sight witnessing. It has been truly stated that because of the rapidity with which the policemen respond to the detail, they themselves become a part of the disturbance.

Mobile police radio was probably the first practical means of effective communication between headquarters and mobile units. This was in the early 1920's and came to us in somewhat of a one-way fashion; namely, headquarters or Station to car. It was not long before Science again gave us the so-called two-way communication, and then ultimately the three-way system of communication to mobile units. Those of us will remember that this system of radio communications came to us first only for our automobiles and in later years, the system of police mobile communication was devised so that it became practical in use on our motorcycles. So today every Law Enforcement Agency has equipped itself with modern police radio communications.

Because of these modern police radio communications systems, many improvements and devices have been designed to enable Law Enforcement Agencies to realize even faster and more efficient services. Many developments have been undertaken, most of which are practical. Some of them, I will take the privilege of mentioning in this article.

For instance, the United States Army Signal Corps Engineering Laboratories have announced the development of a device that uses only the human voice to power a radio transmitter, small enough to fit inside a telephone mouthpiece. A unique technique using a single transistor matched circuit makes it possible for the transmitter to harness the tiny voice power. After the speech strikes the microphone, part of its power is filtered to operate the radio, while the rest puts intelligence into the signal output. It is at the moment in an experimental stage, with distance the only factor.

by

**John A. Lyddy,**

**Superintendent of Police  
Bridgeport, Connecticut**



While we have perfected our police radio communications base station to our vehicles, it still remains that we should also have communication with our foot Patrolman. Sub-miniature receivers have now become practical and are now in operation in a few cities with great success. This enables a one-way signalling radio facility for paging and transmitting messages to the foot Patrolmen. Receivers are light weight, pocket size and are indeed proving very practical. At present, they are about the size of a package of cigarettes, and with the use of transistors, which are definitely coming into use instead of tubes, in a short time, even greater efficiency will be realized from these Sub-miniature receivers. With the development of the Sub-miniature receiver, as well as the transmitter mentioned in this article and many others that are in the design stage, and again, with the use of transistors in both of these units, a combination of both will be developed so that in a very small package, the foot Patrolman will be in a position to both receive and transmit messages from his post, the same as in the mobile units.

Fac-simile is another development in the field of police radio Science and can be used very effectively in our systems of communications. It is a method of transmitting by radio, in exact duplication, messages either written, typewritten or drawn, from point-to-point or to a mobile unit. This would provide a completely written or typewritten message to various police precincts and police cruisers, thus eliminating the necessity of the officer being required to write out in longhand, the text of these messages. Possibly, more important at this time is the secrecy of police communication that it will provide.

In this age of speed, where boundary lines are no limit to the lawless, municipalities must depend upon the cooperation of and to one another if they are to be successful in apprehensions. The perpetrators of crime fortify themselves with capably, fast-driven automobiles and the acquisition of other facilities, tending to throw obstacles in the way of Law Enforcement Agencies in their services of apprehension. Therefore, systems of communication with one another and with clusters and groups of municipalities become very necessary. Such a system of communication provides a so-called "Hot-Line" radio circuit between police departments throughout the area concerned. Specific, assigned fre-

*(Continued on next page)*



**Communications** ..... (Continued from Page 5)  
 quencies are used in this system for the sole purpose of alerting neighboring municipalities and towns of emergencies, such as bank hold-ups, murders, etc. This enables all Law Enforcement Agencies connected with this system to become informed of such occurrences. Through this system, these Law Enforcement Agencies can be immediately informed, and enabled to alert hundreds of police cars, and an untold number of personnel in a matter of seconds, so that a chase can be implemented, road blocks set up and the possibility of apprehension becomes more possible. It is felt that the knowledge of such a system would deter the prevalence of these major type of crimes and result in crime being kept at a minimum through the efficacy of such a system. Some states have country-wide systems of communications and together with monitoring sets in adjacent counties so that in a very short space of time, whole states and sometimes a cluster of states can be informed of the occurrence of a major crime in any city equipped with such facilities. This system can be used most effectively in combination with the modern teletype.

Science has now gone further with this idea and is now giving us what may be termed the "radio citizens' call box." With this practical innovation, it will permit the citizen to immediately contact a police radio dispatcher without the necessity of going through a telephone exchange. It operates by merely turning a handle, which in turn propels a generator that immediately applies filament and plate voltage to a small radio transmitter, which radiates a signal that is modulated by a coded tune of 800 cycles. The coded designation is received at a base station receiver, indicating the location of the box and the call for assistance. This, of course, makes for swift incoming messages. And certainly with the employment of our own police radio dispatching systems throughout our mobile units, our services definitely will become faster and be more deeply appreciated.

Bank alarms by radio is another recent development in communications. This is done by the operation of a small, fixed transmitter, located in the bank and modulated by a tone signal or verbal announcement that is received at Police Headquarters upon the entry of the bank by unauthorized persons.

Various manufacturers of electronic equipment have requested the Federal Communications Commission for experimental radio authority to conduct tests, looking toward the development of radio alarm devices for emergency protection against burglary. The contemplated equipment would be useful to banks, insurance companies and police departments.

It is understood that there are also other types of alarm systems using electronic radiators not required to be licensed by the Federal Communications Commission since the emissions are restricted to levels permissible under the Commission's restricted radiation regulations.



**Officer Raymond Beardsworth of the Bridgeport Police demonstrates a small radio transmitter.**

While the micro-wave and multi-plexing systems of communications may be thought of in terms of states, yet the respective municipalities become an intricate part of such a system, and certainly they should take advantage of this great system of communications. This is a new, point-to-point radio communication, operating in the 800 to 10,000 megacycle band, which includes the use of one or a combination of voice transmission, radio telegraph, radio teletype, radio fac-simile, telemetering, etc. This system of communication between the respective states of our country is definitely expanding.

Not wholly within the realm of communications, but definitely within the realm of electronics as it applies to police services, is the newly inaugurated radio-controlled, traffic light system. One of our largest cities has already installed such a system controlling a number of their busy intersections. This coded, radio-toned system provides remote control of stop and go signals at designated intersections and outlying locations having existing traffic signals. The individual signal lights are radio controlled by equipping them with antennas, receivers, decoders, and electrical mechanisms. The most desirable signal timing is put into operation automatically each day. But it can be modified as often as necessary to facilitate movement of traffic. There is really no doubt as to the practicability of such a system, and municipalities with sufficient budgets more than likely, will follow in the wake of the City of Chicago, which city is the pioneer in such an endeavor.

While we have given much thought and consideration  
 (Continued on Page 12)





*Police Officers called for greater  
driver and passenger protection...*

## FORD answered with LIFEGUARD DESIGN



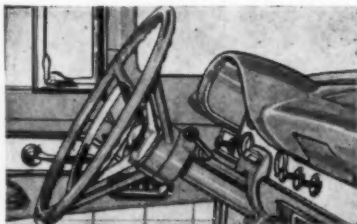
Seat belts help keep driver and passengers from being thrown from their seats, in the event of an accident.

Police authorities have pointed out that accident injuries could be reduced by changes in automobile design.

More than two years ago Ford, in co-operation with police safety experts, universities and medical associations started a program of research and testing so a safer car could be built. The result? Lifeguard Design in the '56 Ford.

For example, the steering post was found to be a major hazard to the driver in accidents. So Ford designed a new steering wheel that actually takes up most of the shock of impact. Occupants hitting hard surfaces within the car—or being thrown out—are the other important factors in accidents. Ford helps protect passengers against these hazards with new double-grip door latches, double-swivel rear-view mirror, optional padding for control panel and sun visors and optional floor-anchored seat belts.

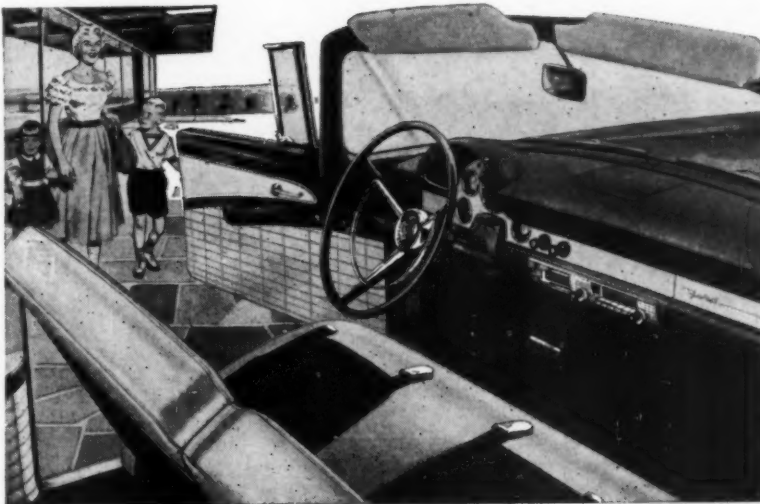
FORD Division of FORD MOTOR COMPANY



Lifeguard steering wheel has deep center . . . helps protect driver from post.



Lifeguard door locks give extra protection from doors opening under impact.



Lifeguard cushioning for instrument panel and sun visors helps lessen injuries from impact against hard surfaces, in case of an accident.

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# "Let's Consider the Radio Dispatch Desk"

by

**Paul M. Cornell,**

**Communications Specialist**



As police radio has developed over the years to be an indispensable tool for police work, so have the problems of proper handling of dispatching from the station to cars, and the design of proper facilities to aid the dispatcher in his job. By the latter statement we mean the proper design of desk or console facilities housing both electronic and communication devices, controls, etc.

Today in many police agencies, an ordinary office desk or table serves as the dispatch position. It may be a problem at most such positions to put another piece of electronic or control equipment on this desk or table, along with the trailing wires which usually are part of such equipment. In addition to the radio equipment involved in radio dispatch desks, many other devices of an electronic, electrical, or control nature are entering the picture and require space at the dispatcher's position. Such items include the following:

- Jail Monitoring Equipment
- Recorders
- Extra Monitor Receivers and Speakers
- Earphone Positions
- Intersystem Two-Way Radio
- Private Telephone or Intercom
- Electric Door Switches
- Recall Pushbuttons
- Cars in Service Switches and Lights
- Etc.

To avert the maze of wires that results from piecemeal addition of items like the above, it soon becomes apparent that consolidation of equipment is necessary to provide for efficient operation by the dispatcher or desk man. It is desirable to plan to have all controls within arm's length of this man's seat position.

## Planning

When new quarters are to be built, or occupied, proper planning for the radio dispatcher's position should be on the agenda. A meeting between interested personnel should include the architect, his electrical engineer, the police electronics expert, police radio technician, and police officials involved (i.e. Police Chief, Communication's Officer, etc.). The architect should be informed about the communication plans, what kind of wiring or conduit is needed, and where outlet boxes are desired, for both 117 Volt A.C., and communication and telephone circuits. Too often, as in

two new police buildings we have seen recently, loud-speaker outlet boxes were placed two feet off the floor, along with the 117 Volt A.C. outlets. Loudspeaker outlets should be slightly above ordinary head level, where speakers usually hang on the walls. Make sure the architect knows where you want such outlets. These are used for paging speakers, intercoms, and radio monitoring units. Be sure conduit planning includes enough for a 10 year expansion program.

## Present Equipment

Present equipment should be evaluated. Decide if expansions or additions are in order. Or perhaps old equipment can be replaced as part of the new planning. Is present equipment easy to handle and located in the best place. If not, plan to correct such a situation in the new design. Most police agencies have a good two-way radio system. Telephone service from the local phone company may or may not be adequate, but can be revised as needed in the new plans. Many agencies have a small interoffice intercom, too, which should probably be expanded in any new quarters. Of course other equipments exist in various departments, too, and can be worked into the new situation as desirable.

## Console Desk

Choice of the actual console or desk for the Dispatcher's position is important. The console should be big enough to easily house the desired components, but often has to be tailored in size to fit the space made available. Some times in new buildings, space can be tailored to the desk requirements, which is nice if it can be accomplished. Regular desks or office type tables can be the basic unit, but better yet is a basic radio or sound equipment console unit, which provides operating table space, with plenty of panel space, designed to mount standard radio panels with 19" spacing between mounting holes. Such panel space is planned within arm's reach of an operator and is ideal for a radio dispatcher position.

## Two Way Radio System

Actually most police radio systems are 3-way radio, meaning Station to Car, Car to Station, and Car to Car. However the general term is "Two-Way Radio." In the U.S. all such systems today are F.M. (Frequency Modulation) in accordance with F.C.C. standards. If more range is desired for future communication, plan for either more antenna height, or more power in the base station and mobiles, and maybe a remote location for the transmitter-receiver unit on a nearby hill or high building. In such a case, the desk console should include mounting for the Remote Control unit which controls the remotely located transmitter. If a local controlled transmitter-receiver unit fits the picture better, make provision for mounting transmitter-receiver chassis in the desk console, or in a cabinet next to it, with microphone and push-to-talk switch on the con-



sole top, or suspended near the operator. The loud-speaker and volume control, and perhaps squelch control should be on a panel close at hand, too. In some instances, to save space, the radio microphone can also be used, via suitable switching, as a mic for intercom or paging, as will be covered later.

### Intersystem Radio

The F.C.C. has assigned many police agencies a special frequency in the 150 Mc. range, to be used for station to station communication only, between police radio stations. No mobiles on this channel, and general police communications can be carried on. The addition of such a communication unit is very important to all police agencies, as a second communication channel is thus provided, and communication can be had with many other stations normally unavailable on the regular mobile channels, because of operation on different frequencies and in different governmental and geographical areas. In a real emergency situation, such as a natural disaster, Civil Defense operation, or other police operational problems, this second communication channel can be invaluable. In such situations wire services, (i.e., telephone, telegraph) will be jammed, and this intersystem channel will find plenty of use, without interference to very essential mobile radio communications. As communication is on a station to station basis, greater range of communication is available because of the higher station antennas used, and even lower cost and lower powered base stations give long range intersystem communications. We feel the inclusion of such additional Two-Way Radio facilities is almost a *MUST* in planning for expansion.

### University Heights, Ohio Police Radio, KQA934, 39.42 Mc.

From left to right: (read down) Type-writer, Bell Telephone Board, Phone. Console: Monitor Speaker, 39.58 Mc. (Ohio Sheriff's Net). Monitor Speaker, 37.18 Mc. (Cleveland Police). (Beneath Meter) Cleveland "All Car" Switches Panel. (Center) 39.42 Mc. Speaker (Univ. Hts. network). (Above on wall) Map, with "cars in service" lights, to show activity in other communities served by this base station. (Center) Mic, with clock behind. Meters are level meters on remote control lines. (Two speakers to right of meter) Jail Monitor and Intersystem (155.37 Mc.) circuit. (Below above two speakers) Jail Monitor selector button bank. (Next Rack) Selective Call Button bank. Electrical Door Lock push buttons, for garage and jail access doors. (Far right Rack) Switch bank for operating lights on "cars in service" map board. Garage door indicator light and up and down switches (above switch bank). (Rear of right hand racks) Selective Call equipment for "Cleveland All Car" and University Heights Recall operations. (On Wall) Bank Alarms. Counter for handling public is on left.

### Recall System

The use of radio signal recall notification to cars where the men may be out on door checks, accidents, etc., is a good addition to existing Base Station and Mobile radio systems. Most of these systems use a tone key superimposed on the FM radio signal, which actuates a relay, to turn on items on the car, such as the red light, siren, horn, or headlights. Several good systems are on the market and are easily added to existing radio equipment, and can be very useful in extending the use of available manpower, and making your cars more efficient in emergencies. As an example, a cruiser crew is out of the patrol car at an accident. A bank robbery takes place nearby, and it is important to notify this crew immediately. The recall signal is sent out, and the horn blows on their cruiser, notifying the patrolmen that they have a call. They return to the car and call in for their message. In this case, usually a hook-up is made so that if the red light is on (as at an accident) then the horn is actuated. If the men are out on some other routine assignment (like checking doors) the red light may be switched on via the recall signal. The amount of space required on the console panels for the recall equipment depends on the number of recall buttons (assigned to cars) required, and upon individual manufacturer's designs. The set up can be made to call cars individually, or in groups. To increase efficiency and make better use of police manpower, a recall system is a good thing. Plan for it.

### Monitoring

Many police agencies find it helpful to put receivers on the frequencies of other police departments, or even  
(Continued on Page 10)







Speed Graphic photo by H. Armstrong Roberts



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## Dispatchers Desk (Continued from Page 9)

other users of two way radio, who may be involved in emergencies of interest to the police, such as local utilities, taxis, railroads, tow trucks and ambulance services. This monitoring can be useful for routine police operations and very, very useful in emergencies! Such receivers can be mounted in console space, or remotely located; with controls only, along with speakers at the operating position of the console.

### Intercom

As an aid to proper handling of messages connected with the two-way radio, good internal communication are helpful. An interoffice type intercom, connecting various offices together for either telephone or loudspeaker communications, or combinations of both, is an important time saver and an efficient method of internal communication handling. As privacy is to be desired in much police work, we suggest the telephone type intercom, or the loudspeaker intercom with telephone attachment, for privacy in police applications.

Loudspeaker type intercoms can be hooked up to allow answering by people in the same room as the speaker, but in the police service, it is more desirable that "secret" type hookups be made, where a push-to-talk switch must be used at both ends to complete two-way talking. An electronics man can arrange for either systems or combinations in the same intercom.

May we point out at this point that one of the intercom positions be installed in the Fire Department, or if only a two-station intercom can be set up, that communication with the Fire Department be the prime use. Police get phone calls reporting fires, and Fire agencies get calls requiring police attention. Most fire calls have a police interest because of traffic problems, injuries, etc., and many police calls may require fire department aid, so quick efficient communication between these two vital municipal departments is very good planning in our book.

### Paging

A good paging system in a police building can be very useful. Police business can be expedited because of the ability to quickly locate desired personnel by paging them over a loudspeaker system. Such a paging system can be combined with the intercom in many cases, or sometimes it is more desirable to have both as separate operations, especially if, as we now will recommend, the two-way radio system is fed into the paging loudspeakers, so that all personnel are familiar with the radio operations at all times, whether in the building or out in the cruiser. Properly hooked up, both transmissions from the Dispatcher (Base Station) and mobiles are easily heard over the paging loudspeakers. In this way, during an emergency situation, a policeman in the building concerned with a case being handled via the radio circuit will be familiar with developments, and will not have to stop at the dispatcher's position to be briefed on what is happening on the air.

### Recorder

The inclusion of a recorder position at the console

*Law and Order*



desk can be very important, too. Such a recorder, tape or wire, can be hooked up through proper switches, to record from the many different communications circuits terminating at the console. Circuits especially needing recording facilities are the radio circuit, jail monitoring circuit, telephones (in accordance with rules for such an operation) and intercom in some instances. Some departments provide for continuous recording of their radio operations, and record all phone calls of an emergency nature, for reference, review or study later, if required.

### Jail Monitor

A good jail monitor system is fast becoming standard equipment in police departments. Not only is it useful in intelligence work, but it allows better use of available manpower, many times in short supply at the station . . . as is general police manpower across the nation. The desk man can keep an "ear" on jail doings . . . and make a quick investigation if things don't sound right. More than one jail suicide attempt has been thwarted because of a jail listening device. When new jails are planned, some sort of accoustical wall and ceiling treatment is desirable, to make the use of listening devices more feasible. Jails as a rule are terrible noise producers because of their poor accoustical design.

### . . . and Other Considerations

Of course other individual console uses are possible. In some instance communication for Civil Defense coordination can be worked into the console, or communication with the Civil Air Patrol, or even local radio amateur emergency nets. While Police Closed Circuit Television is still a dream in all but a very few departments, such Television is bound to grow in use in police agencies in the coming years, and planning for such T.V. installation may be good at this time, with provision for the necessary coaxial lines in walls, and room for T.V. monitoring tube and controls at the console.

### In Large Departments

Large city departments usually have separate radio dispatch and radio operating rooms. In such radio operating rooms, provision for radiotelegraph (Police C.W.) operations are made, and perhaps include positions for more than one radio operator. At the dispatch positions, the use of intercom and remote control radio operations, as well as monitoring, presents more complicated problems. This can be worked out along similar lines as discussed here, but in an expanded manner.

### Conclusion

Communications play a very vital role in police operations today. It is expanding all the time, as is all use of radio, electronics, and electrical operations. Plan to use these facilities to do a better police job and raise the efficiency of your department. Plan now for your expansions. Use communication in all its phases, two-way radio and all the other electronic aids which impiment two-way radio and help all your personnel serve the public in a better manner!

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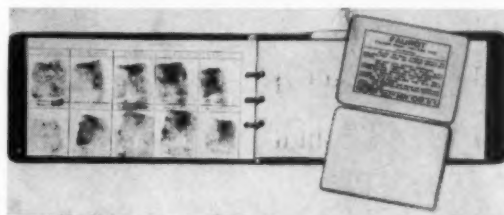
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### Communications . . . . . (Continued from Page 6)

tion to our own radio systems of communication as it concerns our ability of communications between headquarters and mobile units, the question has sometimes been asked, "Are we exerting the same degree of effort in enabling the citizen to inform the police department of any occurrence that would call for police action?" Admittedly, the first contact police departments have with the public when services are requested is through the medium of telephone systems. Are we in the law enforcement services giving the same spirit of attention to public telephone systems as we are in our own police radio communications systems? It can ill afford any of us to lose an emergency call or to have our telephone switchboards not functioning efficiently. Surveys should be conducted periodically of our telephone equipment to assure the fact that we are getting the utmost efficiency from our installation and that the public is not subjected to unnecessary delay or failure in contacting and securing aid from the police. We should, likewise, make certain that the necessary safeguards are placed on this telephone equipment to insure confidence within the minds of our public.

With all of these developments in the field of radio that Science has afforded us, naturally, we cannot and should not permit deterioration or lack of use to our own call box system of communications. They have proved very beneficial throughout the period of years when the police of the Nation were being called upon to perform services within their respective communities. Developments have been made in these call box systems and really, the flashlights and the availability of telephone service between the foot Patrolmen and his headquarters has proved invaluable. This service has been constant and certainly we should not overlook any opportunity to enrich it by our use of it. We can do this by its constant care and efficient maintenance. To the foot Patrolmen, particularly in the outlying districts of any community, this call box system is both efficient and practical.

### Conference on Traffic Courts

The role of traffic courts in accident prevention will be the subject of a five day conference to be held Jan. 30 to Feb. 3, 1956 at the School of Law, University of Southern California, Los Angeles.

The purpose of the Conference is summed up in a statement from James P. Economos, director of the American Bar Association's traffic court program who said, "Traffic courts are a vital link in the chain of accident prevention in any community. They also constitute the greatest contact between Americans and their judicial system. By efficient and impartial handling of traffic cases, the court can become a bulwark in our democratic system—or it can sow the seeds of cynicism and indifference."

For officers in the southwest area—A two week course in traffic supervision for police will begin February 6th at the University of Arizona, Tempe, Ariz. The course will be called "Fundamentals of Police Traffic Service" and is offered by the University in cooperation with the IACP and the Traffic Institute of Northwestern University.



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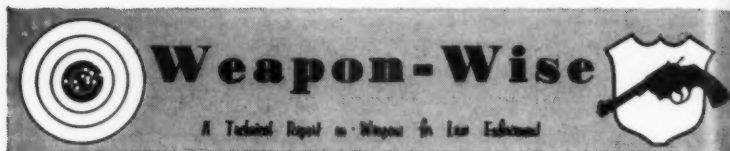
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by  
**David O. Moreton,**  
**Technical Editor**



This year, 1956, the countries of the world with their champions are preparing for the Olympic Games which are to be held in Australia. Unfortunately it is predicted that the countries of the Free World will be outclassed by the Communist countries in many events and what is most important to us, the shooting events. The United States' teams will be good but are they the best we can put into the field? Ours is the wealthiest and most powerful nation in the world and should lead in all peaceful endeavors. To answer the question: Yes our teams are the best we have, but they could be better. They could have more experience; they could be members of some of our crack law enforcement departmental teams. Granted, some are, but our teams need more raw material from which to draw and who in turn need experience in international courses of fire.

Police officers have the enviable position in the shooting fraternity of working with guns in carrying out their daily duties. I do not mean to imply that carrying a sidearm is glamorous, but rather that a police officer should be naturally more capable in handgun use than his civilian sporting handgunner neighbor. Unfortunately neither is proficient without practice and neither can become expert without the chance to practice.

This country's scarcity of championship shooter material is largely a problem of too little practice and too few places to practice. Both departmental and civilian range facilities are insufficient in most areas. Departments having ranges often do not make full use of them, nor is frequent practice *required* by departmental regulations. The civilian shooter lacks a place to shoot and I believe that public use and competition between the police officer and his neighbor would be beneficial in improving public understanding of police problems thereby enhancing cooperation. The resultant esprit de corps among officers, increased proficiency in shooting among the members of local clubs and departments would go a long way toward providing new raw material for the national matches at Camp Perry and for future Olympic Games.

I have made a resolution that in Weapon-Wise this year I will stress the importance of marksmanship and try to promote it at the departmental level.

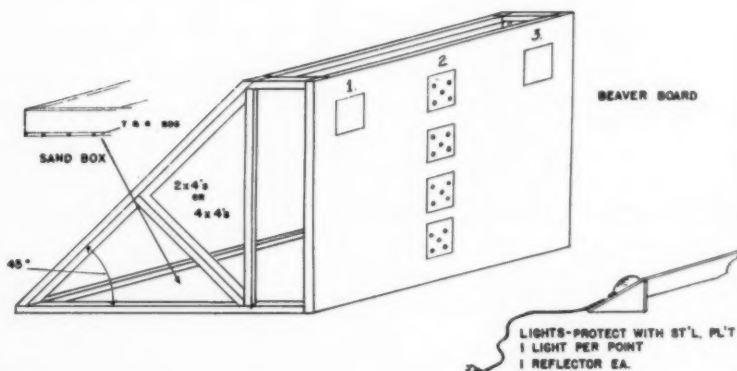
Marksmanship is vital to good law enforcement; the ability once acquired can and should be maintained. It can save lives. When a department is proficient, the lawless element soon knows and respects this ability. A criminal will think twice before shooting it out with crack shots.

Civilians and police officers shooting together would go far toward showing that our democratic way of life provides a better means on a sporting competitive level of developing world shooting champions!

## Building A Range

With 1956's resolution firmly in mind I am going to start the Marksmanship series now. Of primary importance to any program are proper facilities, the biggest item being a safe range.

It is possible to run a shooting program in some local farmer's pasture or field or in the corner of a basement. However for a properly organized program, well designed safe range facilities are called for. Much advice on range construction may be obtained from the National Rifle Association, the Sporting Arms and Ammunition Manufacturers Institute and from the various gun companies. If any of Weapon-Wise's readers run into a unique problem or would like more specific information than appears here please contact me at LAW and ORDER and I will get an answer to you as soon as possible or have a field representative of one of the aforementioned associations answer your query.



I do know that some departments have range facilities; I also know that many small departments do not. In cases where facilities do exist they may not be adequate for a combined departmental and youth program or a co-ordinated departmental civilian club

program. Properly planned, a range can be built that will be adequate for the department program, the departmental youth shooting program and the local pistol and rifle club. Because the three coordinated programs are slightly different it is necessary to



limit the caliber and bullet type used in indoor ranges, in fact it is just common sense to do this. In the illustrations that follow the backstops (for indoor ranges) are of either 1/4 inch or 3/8 inch steel plate. This plate will take a constant beating from the four position (prone, sitting, kneeling and offhand) youth program, and club program, it will also receive heavy use from the departmental pistol program and still stand up. Steel plate of the thickness specified is satisfactory for caliber from .22 to .45 note however that **NO RIFLES ARE TO BE USED ABOVE .22 CALIBER RIM FIRE AND NO METAL JACKETED BULLETS OF ANY CALIBER ARE TO BE USED.** There are two reasons for this ruling: First the backstop will not take the constant pounding of jacketed bullets. Second there is a greater chance of ricochet with jacketed bullets. Lead tends to upset and break up into small pieces making it safer.

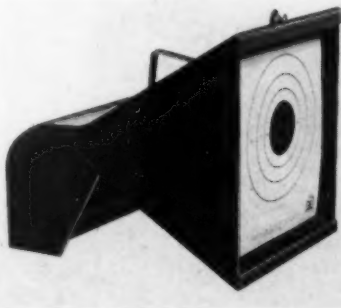
Our first range project will be a simple backstop arrangement for an indoor gallery range. This type of backstop as shown in drawing #1 requires the least capital outlay and the unit can be moved if need be. The room necessary for this economical arrangement should be in the neighborhood of seventy feet or more long, minimum is sixty-five feet. The range is measured from the firing line to the target so the room should be at least 15 feet longer than the range to give room for targets, backstop, men lying at the firing points, room to move back and forth behind the firing line. The room chosen should have good or reasonable ventilation, all doors or windows in the line of fire should be closed, blocked off and protected by a material impervious to ricochets or glancing hits of stray bullets. The following materials in the thicknesses indicated can generally be considered as safe protection for blocking doors and windows along the firing line.

- 1" planking
- galvanized iron roofing
- tile or slate roofing
- ordinary 2 coat plaster.

Our backstop as shown is a simple combined backstop and target carrier with a separate lighting source. Basically it has a box or rectangular shaped base made of 2 x 4's or 4 x 4's; on the face side toward the firing line a frame is erected and covering this frame is beaver board. The back framework of the backstop is set at an angle of 45 degrees and it is to this frame that the steel plate is bolted. The steel plate deflects the bullets downward, where a box is filled with from 3 to 6 inches of sand to catch the bullets. The sand box should be made with tight corners to prevent spilling, also it is a good idea to use 3/8th inch tongue and groove boards or masonite for the bottom if the box

is to be moved. Masonite would not be satisfactory if the box is to be moved frequently, 3/8th tongue and groove is the best choice. The backstop should be at least 5 feet high and 6 feet wide for each firing point.

Lighting the backstop can be accomplished as shown in the illustration, it is recommended that the direct light on the targets be at least 10 foot candles.



Bullet Trap.

Another successful way of installing an indoor range is to make use of a series of Detroit Bullet Traps. Shown in the accompanying illustration these units claim to stop all pistol, revolver and .22 caliber rim-fire rifle bullets. There is a "Super-Model" made to withstand and stop magnum velocities.

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# Primary Police Functions

*An In-Service Training Aid*

## Part One: Crowd Control at Fires, Parades, etc.

by Bruce Holmgren



### Handling Police Work at Fires, Parades, Crowds Part I

An important phase of the police officer's job is the handling of special incidents, both planned and spontaneous. The policing of a parade or an athletic function is a planned incident. A fire is a situation calling for spontaneous action—based on sound planning. This and the next chapter of our series will discuss various aspects of this work.

**Fires And The Police.** An officer on patrol must be alert not only to actual fires of all types but also to the prevention of fires. Both tasks require his attention. We hear a lot these days about fire and police integration—a topic too involved to discuss here other than to note that we personally regard it as unsound as a general practice. We do not wish to offend our good friends among the city managers but we are willing to stick our neck out and advise against integration, as such.

Even so, the officer on patrol must be fire-minded to the extent that he can spot a fire hazard and either take appropriate action or advise the proper agency—whom-ever it may be. Further, by developing a certain sense of fire-consciousness, an officer is able to do a better police job when he encounters an actual fire.

#### Major Police Duties At Fires

The officer's first duty is to prevent the fire by being alert to the hazards causing or contributing to it. Once the fire occurs, the officer (especially at night—when most people are sleeping) must detect it and report it. In this connection the officer must absolutely understand all details of his local fire reporting procedures. Upon discovering a fire he must be sure that the alarm has been sent.

This is vital. Too many officers assume that "someone" has turned in the alarm. Further, the situation usually looks serious and the officers think their first job is to start getting the people out. This is true, but—a policeman must remember that by taking the minutes and seconds needed to verify that the alarm has been turned in *before* he goes into the fire building, he may save far more lives and property than he could by rushing in without being sure of an alarm being turned in.

**Warn The Occupants.** Once he makes certain the fire is reported the next job of the officer on patrol is to warn the people in the burning building of the fire. This may or may not be easy, especially in multiple occupancy structures. However, if an officer has been observant on his beat (night after night, day after day) and has assimilated some knowledge of the buildings on it, he has at least a rough idea of the layout.

Where possible, he should get help, either from other police officers or from civilians. At the same time he should be careful to avoid directing a civilian into a hazardous situation. In any case, he uses his judgment to do whatever is appropriate to rouse the occupants and help them out of the building if necessary.

**Keep Premises Clear.** Assuming that the occupants are out of danger and that any problems involving actual or potential life hazards are met, the next important police job is to keep the front of the fire premises free and clear of obstructions—especially fire hydrants. The fire department needs the help of the police to have free and unimpeded use of the street and sidewalk areas involved.

There is no general rule regarding what to do in carrying out this idea of keeping the way clear. It depends on the place and the time of day. Whether an officer is alone or has help, and whether automobiles or pedestrians require his primary attention will depend on the facts. The point is that an officer must *size up* his situation.

#### Security And Investigation

Once the immediate problems of the fire area are under control the next attention of the police officer goes to the protection of the premises. This means the policeman must prevent the unauthorized entry of persons into the fire building or area. In this connection he must guard against the unlawful removal of property, either by well-meaning friends and neighbors or by actual thieves.

There is always a great deal of confusion at a fire of any size, regardless of the time of day or season of the year. There are just as many police problems at fires in small communities as at those in large cities. It pays men on patrol to reflect on their fire situation and analyze the different kinds of problems they encounter while policing a fire, to plan for the next one!

**Help Fire Officer.** At any fire, the police officers must take the advice of, and cooperate with, the fire chief or whomever is in charge for that department. This is in no way suggesting that the policeman takes orders from a fire officer rather than from his own police superior. It is simply that the fire officer is responsible for getting the fire out and the premises restored to some semblance of order.

So, he needs all the help he can get from the police. A little cooperation goes a long way. It may be in order to suggest that both the fire and police personnel might well spend some time getting familiar with each other's problems. Doing so might eliminate a lot of the misunderstanding (and sometimes, out and out quarreling that sometimes we see take place at fire scenes) between the two services.

**Keep Fully Informed.** Further, the police officer at the fire should keep informed regarding its progress and should keep his headquarters apprised of what is going on. The prompt reporting of some unexpected turn of affairs at a fire may make possible a better police job. If you keep your station informed, your desk officer can arrange for reinforcements, or handle whatever may happen.

Police officers on duty at fires should be particularly alert to problems arising in connection with injuries



and accidents—either to civilians or to policemen and firemen. When an explosion occurs, a wall callapses, or something of that sort takes place, a fast report by a policeman may save the day—in speeding up the dispatching of special equipment.

**Remember Public Relations.** Perhaps at no time is the police officer "on the spot" with the public as while he is handling a fire, disaster, or a similar situation. All men are alike in their desire to get as close as possible to the scene. The police must protect them against the perils of getting too close to the actual fire or being too near the lines and equipment involved.

A policeman must be alert to unexpected dangers, such as bursting hose and the like. Normally, this is a fireman's job but a policeman may be right there when it happens! Likewise, when a line gets out of control, it may be a policeman who can come to the rescue of his fire department colleagues—by helping them pin down the twisting hose, until other help can be had.

**Courtesy Pays.** At every fire there will be many, many people who want to know what it is all about. If he can spare time and attention from his duties a policeman should try to answer these questions in a reasonable way. As we stressed in our material on public relations, it will pay the police dividends to exercise this kind of courtesy. Likewise, when an officer is moving back a crowd, or is running the spectators out of the danger zone, so to speak, he should do it in a courteous manner.

There is still another reason for keeping up good relations with citizens at fire scenes. Sooner or later the police may be investigating the cause of the fire or investigating certain events (such as burglary or even robbery) that took place during the excitement of the fire. Arson may be involved. Information from bystanders may prove of real value in patching together

the various fragments of information uncovered during the investigation of a fire.

#### Traffic Problems At Fires

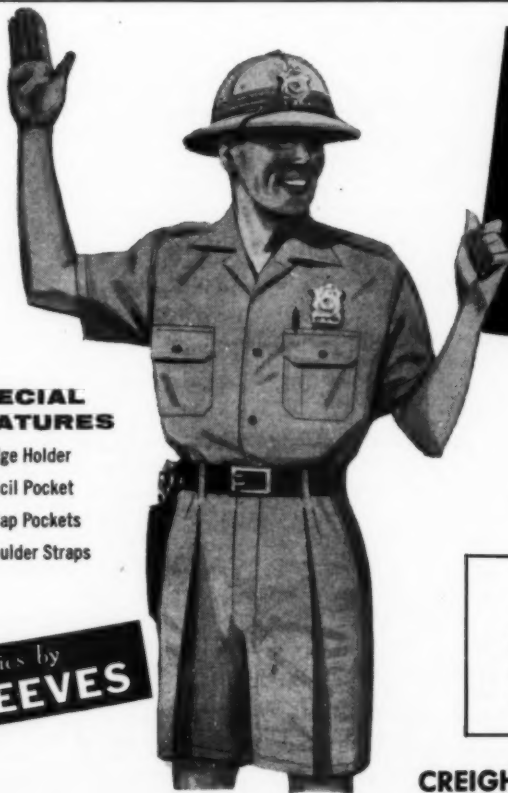
With the preceding paragraphs as a general outline of what a police officer must do at a fire, it is necessary to take a closer look at the traffic work involved in policing a fire. This is the policeman's most probable assignment at the fire—whether he discovers the fire or is dispatched to it. As he approaches these tasks, he remembers that his basic objective is to facilitate the work of the fire department.

For example, perhaps his first task upon reaching the fire scene is to keep vehicles from parking or standing at the point of the fire, such as directly in front of the fire building. A good police officer is especially alert to hydrants, standpipe connections and the like, to make them available to the fire forces by preventing vehicles from obstructing them.

**Control of Vehicles.** Another important job may be to prevent vehicles from following the fire apparatus—especially the first of several pieces of apparatus. A parallel task is the shutting off of corners, to keep open the block where the fire is—so the fire forces may get through. Sometimes the most important thing a policeman can do is to stop a block or two short of the fire and divert traffic, so that the way is open for fire equipment.

A special problem, particularly at major fires, is keeping the way open for second or additional apparatus. A typical situation is that traffic more or less closes in on the first alarm apparatus, or on the first truck or pumper in. As a result the succeeding pieces of equipment cannot get through freely. The police

(Continued on Page 18)



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**On The Beat** ..... (Continued from Page 17)  
must keep the way clear, not only for the fire equipment but also for such vehicles as ambulances, public utility emergency crews and the like.

**Watch Your Spectators.** In connection with the handling of traffic, a policeman at a fire must be alert to traffic problems involving pedestrians and spectators. There are apt to be children on bicycles, as well as persons of all ages (there seems to be no upper age limit at which a person no longer has interest in seeing a fire) converging on the scene.

Therefore, the police must make sure these people are not in the path of approaching apparatus or other vehicles. Further, the police must handle the spectator and pedestrian traffic *at the scene*. It may prove helpful to string ropes or use saw horses to facilitate the control of spectators. There is no limit to the resourcefulness of persons wishing to watch the fire department. An officer should be alert to such people climbing onto almost anything constituting a point of vantage.

**Don't Do Too Much.** This idea is the key to the entire job of police work at fires. The officer should not try to do too much, but should concentrate on what appear to be the most demanding problems at the time. Almost anywhere but in the largest cities the police are short-handed at fires.

Therefore, the officer must use good judgment in deciding what job is most important for him to do. It may be traffic control at a key corner or it may be handling spectators at the fire building. The point is that you cannot do the whole job and should not try to be everywhere at once. Instead, remember that a

good officer does the best he can in handling a limited phase of the job, but a phase impressing him as being important.

#### What To Do When You Discover A Small Fire

There are just two things for an officer to do when he finds a small fire or one that appears trivial. First, he reports the fire by calling the fire department or doing whatever is required to notify the proper office or station of the fire. Second, and only after he turns in the alarm, he gives "first aid" to the fire—by using whatever extinguishers he has.

Above all, the competent officer does not try to take the place of the fire department. The record is abundant with cases of persons other than firemen trying to put out the fire, then calling for help after the fire started getting out of control. Don't let this happen to you! Take no chances and report the fire before trying to put it out.

**Police Not Firemen.** The typical police officer is a specialist in law enforcement and usually is not qualified to judge whether or not a fire is serious, or even whether or not it is extinguished. An apparently "out" fire may be running through a partition and will break into flames after the police leave.

Unfortunately, many communities who depend wholly or partly on outside fire departments send their police to the scene of a reported fire, to appraise whether or not the fire department is necessary. It is true that many trivial fires are put out by the householders themselves or by the police. But basically, the police should apply "first aid" only and should leave the fire extinguishment to the firemen.

#### Problems Of Fire Hazards

There are three important things for a policeman on patrol to remember and do about fire hazards on his beat. First, he should be alert to all kinds of careless or unauthorized burning, and he should be alert to a variety of common fire hazards. By being alert to the incipient fire he may be preventing a major fire from taking place on his beat.

Second, he should constantly study his beat and report matters of hazards to higher authority. In connection with our discussion of regulatory work, you will recall that the police have to supervise a certain amount of license or permit matters—simply because they are on patrol and are out where these situations may be observed. The point here is that the man on the beat must be alert to matters of this sort—even though he takes no action other than to turn in a report for transmittal to the proper department.

**Making Inspections.** Third, the policeman should be alert to the inspection of all kinds of places of public assembly. This is especially important in communities without paid fire department, and where firemen cannot be on duty at such places. There are many fire hazards open to police scrutiny, such as blocked exits in theaters and the like.

This is not to suggest that the police officer on patrol should become a one-man fire prevention bureau. Even so, the officer must use judgement and recognize that at times his most important police task is to enforce a fire regulation—or advise higher authority in order that the appropriate agency may enforce it.

**EDITOR'S NOTE:** Next month's discussion will cover the handling of parades and crowds.

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## To The Editor

Tulsa 6, Okla.

Dear Sir,

My name is Barbara Jean Jenkins. I am a negro girl, 15 years of age and a 10th grade student at Booker T. Washington High School.

About a year ago, when I was in Junior High School, my social studies teacher helped my class in choosing several occupations so that in the future we would have one or the other in mind to do or be. I too had several choices but among them was my dearest desire I had since I was a small child, to be a policewoman. I don't know why or how this feeling got into me but it did and there is nothing I can do about it but try very hard to be a "cop."

Realizing my feeling for this particular occupation, my teacher gave me a two page booklet that gave me some information on police work and also names and addresses of some organizations and periodicals where I could go or write for additional information concerning police work.

So I'm asking you and your periodical to please write and send me all the information you can about this work.

Thank you,  
Sincerely

Barbara Jean Jenkins  
From The Editor

New York 36, N. Y.

Dear Barbara Jean,

For a boy to choose the occupation of law enforcement officer is not unusual because the glamour of "cops and robbers" paints a picture of adventure and excitement. To have a young lady inquire about the profession as her choice of life's work is a little out of the ordinary...and yet, as I think about it, there is no reason for it to be unusual. Policewomen are an important part of law enforcement.

What new fact can I tell you about law enforcement? The movies and television have done much to publicize the work of the officer. You know, it isn't the best paying job in the world. Many unskilled workers can make more money than a police officer. However, if you get to know policemen, you will find that they belong to a brotherhood of men who work for more than money. Their job is one of service to the community and they spend their working hours helping people. Even in off duty hours, you can find them working with the youth of the town, helping them to grow into better citizens. We could write many pages on the disadvantages of the job...the long extra hours with-

out pay...the "important" politicians...the ingratitude of people...the demanding citizen and others who contribute to the making the "policeman's lot an unhappy one." However, no matter how discouraging the picture is...if you WANT to be a member of the profession, you won't pay a bit of attention to the harsh things that are said about the job. Before making up your mind...put yourself through a test and find out WHY you want to be a policewoman. Is it the uniform and badge which gives authority and a feeling of "being someone"...or is it a sincere desire to be of service? Do you REALLY like people?

In modern police departments there is an increasing need for trained personnel. Police work has many branches...for there is the Traffic Department, the Bureau of Licenses, the Identification Bureau, Criminal Investigation, the Youth and PAL Bureau, plus many others. As in most businesses today, a good education is important. Job competition among young folks is keener than ever before. Get all the education you possibly can, for a degree in Public Administration and Social Service will make you a valuable person and increase the possibility of your being placed in a responsible position.

A policewoman is particularly adapted in working with youth. As

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I mentioned, there are so many phases of police work that it would be an endless job to write the names of the hundreds of worthy books on a particular subject. There is, however, one book on fundamental policing entitled "The Policeman's Guide" by Cornelius F. Cahalane that I think might be of interest to you. Most certainly, though, your librarian will assist you in the selection of books that will help you the most.

Thank you for writing us and we wish you the best of luck in your career.

Very truly yours

Lee E. Lawder, Editor

## LAW AND OR-DITIES by HIGGINS

IN FORT WORTH, TEXAS SWING WAS MIXED WITH POLICE CALLS WHEN A CABLE SPlicer HOOKED UP THE POLICE SHORT WAVE RADIO WITH A "CANNED MUSIC" COMPANY



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DID YOU KNOW THAT THE AVERAGE TERM SERVED BY A CRIMINAL JAILED FOR A MAJOR CRIME IN THIS COUNTRY AMOUNTS TO FIVE YEARS AND TWO MONTHS



IN LOS ANGELES TWO PATROLMEN IN A POLICE CAR HEARD THE FOLLOWING ANNOUNCEMENT: "GO TO 132 BUNKER HILL ST. WOMAN WEARING A WEDDING RING AND NYLON STOCKINGS. THAT IS ALL". WHEN FOUND SHE WAS BOOKED ON A CHARGE OF DRUNKENNESS



TOM HIGGINS JR.





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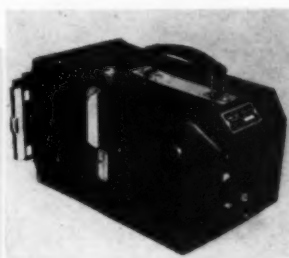
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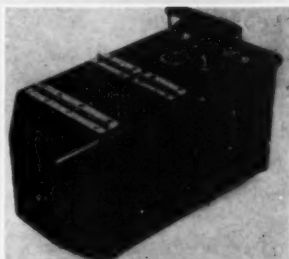
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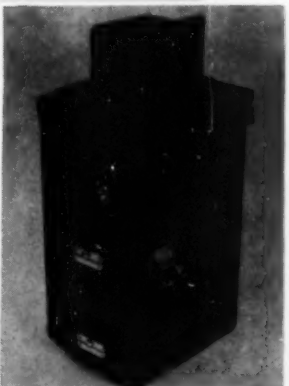
*These cameras manufactured by Sirchie, Inc. the world's largest manufacturers of crime detection equipment.*

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*Our 1956 catalog with the latest Search developments will be released in March 1956. Issued free to law enforcement agencies only.*

*Protected by U.S. Patents pending.*

For further information circle #52 on Readers Service Card



**D**URING FEBRUARY and March, 1954, many students, both boys and girls, of our local high school were being given tickets for speeding and other juvenile misdemeanors with which most police departments of today are faced. This set me to thinking, "How might we, the local police department, stop most of this?". To begin with, I took the first easy and delightful step! I began to make friends with all the children in town. I won their confidence by proving to them that "cops" were not as bad as they were possibly thought to be. This type of relationship with the young group continued throughout the spring and summer.

In November of that year the idea of forming a Junior Auxiliary Police occurred to me. With the assistance of Desk Sergeant Manuel Valadez, we began the work of formulating and gathering information and materials for this plan. After many hours of hard work and thought, we finally accrued enough materials and ideas to present our idea to our Chief of Police, Truett Jordan. Immediately Chief Jordan approved and highly endorsed the plan. With his suggestion that the City of Mission furnish caps and badges and that it be written into the City Ordinances, we presented our plan to the City Commission and Mayor. They immediately approved it and wrote it in the ordinances.

The next step was to enlist and enroll the personnel. I did this by contacting the public school authorities who gave time for me to talk to all the boys enrolled in high school, this being one of the requirements to be met by all applicants. After talking to this group of boys, I handed out approximately one hundred applications to those who were interested in this organization. After carefully screening all the applications, by using school records, personal interviews, and other means, we kept thirty-one applications. These boys were chosen because of their good character, clean record, passing grades, parents' consent, and their interest in civic activities.

Our first meeting was called and held in the City Hall on January 5, 1955. After carefully going over all the rules and regulations, the members were then sworn in by Chief Truett Jordan. Each member was given a copy of the "Rules and Regulations." It was de-

## AUXILIARY POLICE SOLVES YOUTH PROBLEM



cided, by the members, that each weekly meeting would be opened with a prayer. Officials were elected, which consisted of two captains and four lieutenants. These officers would be in charge of their particular groups, which would consist of the remaining members. Other officers were elected, these being, a secretary and assistant secretary, treasurer and assistant treasurer. A recreational committee was appointed, this committee being responsible to provide and furnish some type of entertainment for the members.

Our second meeting was held January 14, at which time we discussed and made plans for aiding in the Citrus Fiesta, which is an annual celebration and highlight in our city. The Junior Auxiliary policemen did a grand job in directing traffic, assisting in lining up the entries for the parade, and of utmost importance, relieving the regular policemen from these minor, but important, duties to be elsewhere.

Our largest event, to date, was a mock disaster put on by the City of Mission. The Junior Auxiliary police was assigned to an area which covered approximately eight city blocks, their duty being to keep all persons from entering this area during the "disaster." This they did with great success.

Another big event coming up soon will be the Annual Auxiliary Police Ball, sponsored by the Police Depart-





by  
**Officer Edward D. Morgan**  
**Mission (Texas)**  
**Police Department**



ment. This ball is open to every boy and girl in the Rio Grande Valley. Included on the evenings' program will be dancing, talent show, bop contest, and door prizes. Prizes have been donated by the merchants of Mission. I might add that the merchants have co-operated 100% throughout this entire operation.

For diversion and entertainment we have organized a baseball team, a bowling team, and numerous other activities are being planned for the summer months.

Other than being taught different phases of the law, the Junior Auxiliary Police members are permitted to patrol with the regular patrolmen at night and during the day in order to receive first-hand information on what and how it is to be done. The Junior Auxiliary Police members are not authorized to make arrests or issue tickets unless with an officer or under special orders of the Chief of Police.

Since our organization was formed the number of members have increased to fifty. We are hoping that the City will furnish enough uniforms in the next year to outfit each member.

Since our Junior Auxiliary has been in operation our worries of speeding have diminished. All students have a great pride and have shown great respect in the work done by this group. The community is equally proud of this organization.

To prove the worth of our Junior Auxiliary Police, we have not had a single student traffic violation nor have we had any kind of court for the usual juvenile cases. Utmost of importance, we have had no accidents during this period, a record that speaks for itself.

The success of our organization has sprung from the fact that by being treated humanely, these boys and

girls have proven to be humans—with good common sense. Times are changing and along with the changes of time, our police department must change. We must realize that the future depends upon the present. How our youth goes today, so goes our nation tomorrow.

I would like to extend this information to any police department in the country—if you need any information that might help you in organizing a similar organization, we, of the Mission Police Department and Junior Auxiliary Police, would be delighted to send you any literature in our possession of any information that we possess. We believe our organization to be the only one of its kind in the State of Texas.

(The following is the text of the resolution which has been certified by the Chief Clerk, House of Representatives, Texas.)

H.S.R. No. 323

### Resolution

**WHEREAS**, The City of Mission now has an Auxiliary Police Department; and

**WHEREAS**, The said Auxiliary is composed of students from Mission High School; and

**WHEREAS**, Chief of Police Truett Jordan, organized the said group, and Officer Edward Morgan is the supervisor of the said group; and

**WHEREAS**, This group of young men assist the citizens of the City of Mission, which is an incentive to the young people to become better citizens; and

**WHEREAS**, It is the purpose of this fine group of young people to aid their fellow students to better understand and to obey and comply with the laws; and

**WHEREAS**, This group is one of the major organizations combating juvenile delinquency; now, therefore, be it

**RESOLVED**, That the House of Representatives of the Fifty-fourth Legislature extend their congratulations to Chief Jordan, Officer Morgan, and all the members of the Mission Police Auxiliary, and that enrolled copies of this Resolution be forwarded to them.

de la Garza  
 Spilman  
 Ellis

s/Jim Lindsey  
 Speaker of the House

I hereby certify that H. S. R. No. 323 was adopted by the House on May 2, 1955.

SEAL

s/Dorothy Hallman  
 Chief Clerk of the House

Left: Chief Truett Jordan and a group of the Junior Auxiliary Police.

Right: Officer Edward D. Morgan and a Safety Patrol of Mission, Texas.

January, 1956





# POLICE EQUIPMENT NEWS



## New Safety Belts

The Trimount Plastic Company, Incorporated, 71 Dudley Street, Arlington 74, Massachusetts, has added a new idea to safer traffic direction by introducing the protection of a plastic cover to present reflecting type safety belts worn by traffic officers. These



"Safer-Safety Belts" lock in the reflecting material and protect this material against water, rain, sleet, snow, ice, sun or dirt for extended periods of time. For additional information, circle #89 on Reader Service Card.

## Secret Recorder

Amplifier Corporation of America, 398 Broadway, New York 13, New York, has made available a two-speed Secret Recorder designed specifically for investigative work. The new unit is a lightweight, miniature recorder of unusual fidelity, versatility and dependability. The Amplifier Corporation has ingeniously camouflaged and concealed the unit in a false compartment located in the central section of a genuine leather briefcase. The recorder weighs 11-3/4 pounds measuring 16 inches long x 12-1/2 inches tall x 4-1/2 inches wide. Using a sensitive, built-in microphone, the unit picks up whispers in a quiet area at a distance of 12 feet and ordinary speech at 100



feet. The unit may be used for dictating purposes by the use of an external microphone with a control switch for remote start-stop operation. Recording at a tape speed of 15/16 lps using extra long-play 1/4 inch magnetic tape provides 4 hours of continuous recording or 8 hours of dual track recorded material. For additional information, circle #90 on Reader Service Card.

## Sign Span

Pfaff and Kendall, 84 Foundry Street, Newark, New Jersey, is producing a sign span which features a new

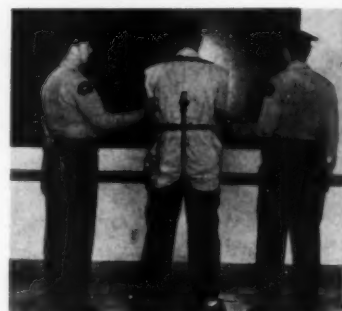


type of aluminum fabrication developed by them. The supporting shafts are seamless, tapered, all aluminum,

with the span all welded of individual sections. This construction results in a lightweight, easy to install structure that is free from cumulative corrosion and subsequent weakening, plus an attractive appearance with no need for painting. For additional information and engineering data, circle #92 on Reader Service Card.

## Restraining Device

Heymans and Torbert Enterprises, Box 516, Norwalk, California have marketed a new type of strait jacket. Designed for use by law enforcement officers, this jacket is made of heavy duty canvas with one inch webbing and nickel plated hardware. Designed to save embarrassment of handling



psychos and other belligerents with "kid gloves" while being subjected to mauling, kicking, scratching, punching or biting, the new jacket, gives immediate control of the person. Once the suspect is in the jacket, a search can be accomplished with ease through the use of the slit pockets of the jacket. For additional information, circle #91 on Reader Service Card.

When corresponding with firms whose products you read about in our book, mention that you saw it in LAW AND ORDER. It helps us and we appreciate your thoughtfulness.

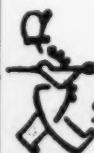
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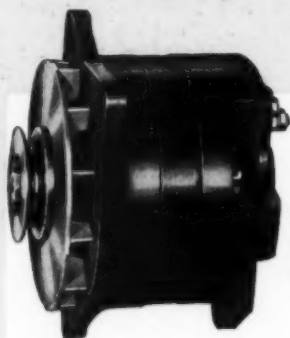
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**POLICE**



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This 12 volt L-N Alternator is mechanically the same as the familiar Type 5058, the 6 volt, 95 ampere L-N Alternator that has been proved on thousands of police cars since 1946. It delivers up to 60 amps at 12 volts (equal to 120 amps at 6 volts). L-N Transformer for 110 volt current can be attached.

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For further information circle #39 on Readers Service Card



# "According to Law..."

Edited by Irving B. Zeichner  
Counsellor-at-Law



## Admission of Photographs

Defendant shot and killed his wife and her male companion while they were sitting in an automobile parked in front of a tavern. He claimed that they were about to commit an act of adultery.

The coroner, in describing the wounds inflicted upon the two victims, referred to photographs of the dead bodies taken in the mortuary shortly after the shootings.

Convicted of murder, the defendant, on appeal, maintained that the trial court abused its discretion by admitting the pictures into evidence. He contended that the testimony of the coroner was sufficient to establish the fact and cause of their deaths, the course of the bullets through the bodies, and the nature of the wounds, and that the photos were offered solely for the purpose of influencing the jury.

The Supreme Court of Washington affirmed the judgment and held that photographs of a deceased person are competent evidence for the purpose of

having an examining physician identify the body which he has examined. It encouraged the use of photographs to aid the jury in understanding the physical facts relevant to the case.

"The photographs are, if anything, less disturbing than the verbal description of the injuries given by the examining physician. The fact that they might tend to prejudice or inflame the jury is not a sufficient objection if the pictures are otherwise competent. Appellant does not contend that the pictures are inaccurate representations of the bodies as they appeared shortly after the shootings."

## Admission of Recordings

Defendant was convicted of asking and receiving a bribe to influence his official acts as chief of detectives of the county sheriff's office. This occurred while he was in charge of the investigation of a burglary involving a Tacoma policeman and others.

After the policeman was released on bail, he began collaborating with the

prosecuting attorney's office in connection with the defendant's activities. He testified that the defendant sought money to get him "county time in jail without going to the penitentiary for the offense that I was charged with."

The prosecutor's office furnished a miniature battery-powered "minifon" wire recorder to the policeman and showed him how to operate it with the recorder concealed in his belt and the microphone in his shirt pocket. Thus equipped, he contacted the defendant and a series of conversations were recorded.

The original wire records being inaudible without the aid of earphones, they were taken to Electricraft, Inc. where a "Minifon" representative "dubbed" the conversations from the original wire recording, by a standard reproduction process, to a tape recording. The latter, being played audibly

(Continued on next page)

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For further information circle #34 on Readers Service Card



**Q and A** . . . . . (From Page 3)

of a witness by opposing Counsel to test the truth of previous evidence or assertions.

**Q.** In a trial, who cross examines?

**A.** The District Attorney cross examines the defense witnesses and the Counsel for the defense cross examines for the defendant the witness of the Commonwealth.

**Q.** Could a ten-year-old boy testify against a defendant as an expert?

**A.** Yes, if he could properly qualify before the court in his particular field of endeavor through experience which he has attained by study and practice, such as a game of marble, etc.

**Q.** If a defendant does not make his appearance on the stand on his own defense, who is permitted to comment on this fact, the District Attorney or the Court?

**A.** No one is allowed to do so, and the court would instruct the Jury that they should not be influenced against the defendant by the fact that he did not take the stand in his own behalf.

**Q.** In a trial, a witness states that a defendant had done certain things and the defendant denies having done so. Who is the jury bound to believe?

**A.** Whichever one appears to them to be the most creditable, in their own judgment. They may convict or acquit.

**Q.** What is a fugitive from justice?

**A.** A person who has committed a crime and flees to avoid arrest and prosecution.

**According To Law** (From Page 26)

without recourse to earphones, was introduced into evidence.

Defendant contended that the audible tape recording was secondary evidence and inadmissible because the best evidence was available, namely, the original wire records.

The Supreme Court of Washington held that the audible tape recording bears the same relationship to the inaudible wire recording that a photograph bears to a negative and was likewise admissible.

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The plant patrolling officer no longer must leave the fire to summon assistance. He is in contact with his headquarters by portable communication equipment. Photo courtesy Chas. C. Thomas, Publishers.



## The HALLICRAFTERS Story

### Portable Two-Way Radio Telephone

The Hallcrafters Company of Chicago is the manufacturer of short-wave communications sets that have proven to be extremely valuable to the Public Police as well as the Industrial Plant Police Agencies.

The Hallcrafters portable two-way radio, being light weight and of good signal strength has spanned the gap of two-way communications with the foot-patrolling officer.

Utilizing this valuable communications tool has permitted the individual officer to maintain instant communication with his headquarters while performing his immediate duties. The Industrial Plant Guard no longer is forced to leave the scene of a fire outbreak to summon aid. With this portable set, he is placed in the valuable position of applying first aid measures while simultaneously requesting aid. It is often said that the first three min-

utes of a fire is the most important interval of time for its extinguishment; this valuable interval is not sacrificed by his compulsion to leave the scene to summon help.

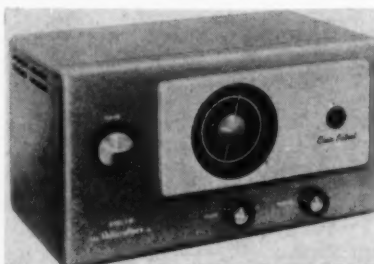
The foot-patrolling officer of parks, forest preserves, etc. as well as the officer engrossed in surveillance duties have become more effective through the use of these portable units. Such equipped officers have boosted their personal safety consideration with this equipment of instant communication

at their disposal.

These portable hand carried units are available in the 9½ pound size—dry battery and the 14 pound unit equipped with high power rechargeable storage batteries. They may be intermixed in all conceivable combinations or tied in with other existing more powerful FM two-way radio systems.

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These economically priced receivers are available for the broadcast bands 30-50 mc (S-94) and 152-173 mc (S-95) have become extremely popular with the police and fire department personnel who are interested in listening in on their department's short-wave communications while off duty in their homes. This receiver is ideal for the small sheriff's sub-stations, private police agencies, etc. The low retail price of \$59.95 and the superb qualities have made this unit an outstanding popular item.



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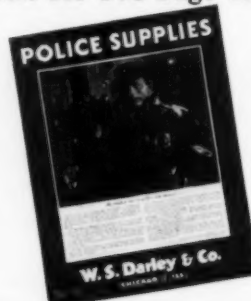
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# The MOTOROLA Story

by  
**Robert E. Newlin,**  
*Motorola Communications & Electronics, Inc.*

Over 40 times as many mobile radios are in use today as there were 10 years ago, and the number continues to grow rapidly. Today's high compression automobile engines radiate much higher ignition noise voltage than their predecessors. Man-made noise signals have multiplied proportionately to the vast number of electronic and electrically powered devices. This tremendous increase in signals in the 2-way radio frequency spectrum makes communications much more difficult than it was a few years ago. It demands the ultimate in equipment performance, and has stimulated design refinements that weren't even considered at the birth of 2-way radios.

Design refinements which have been incorporated into Motorola's new "Twin-V" radiophones include a "bandpass" speaker and audio circuit which filters out ignition noise, an

simplifying maintenance in mixed fleets of 6 and 12 volt vehicles, and precluding obsolescence of radios in 6 volt vehicles replaced by 12 volt vehicles.

## "Self-Balancing" Filament Supply

This circuit prevents harmful voltages from damaging the equipment if a tube filament fails. It maintains approximately "half" voltage on each of the two filament sections (ground-to-6v and 6v-to-12v) even though current requirements might change between the sections. Without this "self-balancing" feature, the higher voltage on one section would shorten filament life in that section, possibly straining other filaments which upon failure would cause further unbalance and possible further filament burn-outs.

## "Low Speed" Dynamotor

A new type dynamotor is used in the dynamotor vibrator power supply for 60 watt transmitters. It has a highly efficient laminated field structure which enables lower speed operation. The lower speed, in turn, provides better commutation, increasing overall efficiency. Frequency of maintenance is decreased and life of the unit is extended.

## "Bandpass" Speaker

The audio circuit of the receiver and the speaker are both specifically designed to provide the best possible voice reproduction for mobile communications. Both have a "bandpass" frequency response which reproduces only that portion of the voice frequency spectrum necessary for full intelligibility, and attenuates all other signals including ignition noise, harsh and other unwanted interference signals.

The new speaker was selected after extensive side-by-side comparative listening and measurement tests proved its superiority over other types. It has exceptional sensitivity and clear,

crisp response. Readability is excellent under all volume and noise conditions. Rugged military-type construction provides high resistance to effects of moisture, heat, cold and fungus, and metal parts are tested to withstand 50 hours exposure to salt spray without damage.

The speaker is designed for continuous operation in extreme temperatures, humidities up to the condensation point, and severe dust and vibration conditions. The voice coil assembly is completely dust tight.

## "Universal" Audio Level Control

Systems with several makes of equip-



ment sometimes use less (or greater) than standard FM transmitter deviation to compensate for equipment differences. If the resultant abnormally low (or high) recovered voice energy is applied to the fixed audio circuits, the voice message may be weak or distorted. "Twin-V" receivers have an adjustable audio level control which provides an easy adjustment for the best voice reproduction.

## "Anti-Clamp" Squelch

Sensitivity and stability of the noise compensated squelch circuit have been further improved. High sensitivity  
(Continued on Page 44)

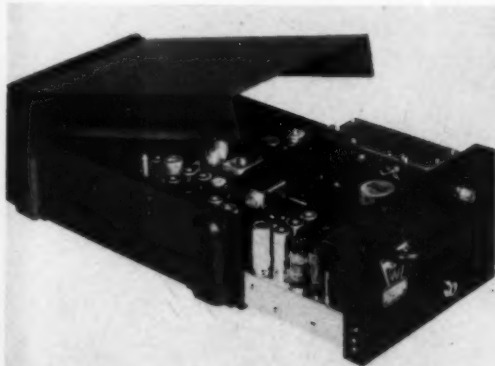


"anti-clamping" squelch circuit which holds open smoothly on weak signals, a "self balancing" 6/12 volt filament circuit which prevents over voltage on tube filaments, and a plastic sealed receiver filter for easy conversion to "split-channel" operation.

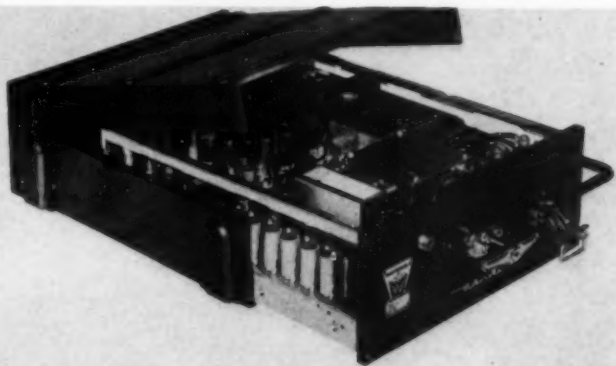
## Universal 6/12 Volt Operation

The transition from 6 volt to 12 volt vehicular electrical systems posed a major problem temporarily since most radio equipment was designed for 6 volt operation only or 12 volt operation only. Now, "Twin-V" radiophone drawer units operate interchangeably between 6 and 12 volt vehicles without modifications or changes of any kind,

Motorola Model M C 1789



Motorola Model M C 1791







## The R. C. A. Story

A wide range of two-way radio equipment, designed to meet the requirements of virtually all types of police radio communications, is marketed by the Communications Products Department, Radio Corporation of America.

The RCA line embraces mobile radios and base stations for operation in each of the three police radio bands—30-to-50, 148-to-174, and 450-to-460 megacycles. For each band category, numerous types of mobile and station equipment are provided, offering varying characteristics and features to meet the individual needs of each police fleet and station installation.

RCA Fleetfone equipment is designed for operation in the 30-to-50 megacycle band. The Fleetfone line includes RCA's CMV-2 Series of 30-watt mobile radios; CMV-3 Series of 60-watt mobile radios; CSF-60 Series of 60-watt base stations; and CSF-250 Series of 250-watt base stations.

All RCA Fleetfone mobile radios are available for either standard or narrow band; feature 6-12 volt convertibility, and, in the 30-watt power class, can be selected with either dynamotor or vibrator power supply. All 60-watt types are available with either standard or dual dynamotors.

The Fleetfone station equipment is offered in three major designs—desk console, or with cabinet or polemount housings. Each is available with either standard or narrow bandwidths, multiple-frequency options, and local or

remote controls.

RCA Carfone-150 mobile and station equipment is designed for operation in the 148-to-174 megacycle band. Carfone-150 equipment includes the CMC-10 Series of 10-watt mobile radios; CMC-30 Series of 30-watt mobile units; CSC-10 Series of 10-watt base stations; CSC-60 Series of 60-watt base stations; and CSC-250 Series of 250-watt base stations.

All RCA Carfone-150 mobile radio equipment feature complete 6-12 volt convertibility; have an efficient vibra-



RCA CSF-60A 60-watt base station equipment.

tor power supply with low current drain; and are available with either standard or narrow selectivity, and a choice of companion stabilities of .003%, .0015%, or even .0005%.

RCA Carfone-150 mobile radios also feature sectionalized chassis construction, with transmitter, receiver, and power supply designed as separate in-



Mobile RCA Carfone-450 radio.

dependent units and assembled in a single case. This separation permits change of units for maintenance and enables the user to substitute with maximum economy new developments in transmitter, receiver, or power equipments.

Carfone-150 base stations are designed as desk consoles or with cabinet and polemount housings, and are available in a variety of selectivity, stability, and multiple-frequency arrangements.

RCA Carfone-450 equipment is designed for operation in the 450-to-460 megacycle band, and incorporates the CMU-15A Series of 15-watt mobile radios and the CSU-15B Series of 15-watt base stations.

RCA's latest type of two-way radio equipment, the Carfone-450 mobile units and base stations, introduced this year, are designed for adjacent channel 50-kilocycle operation in anticipation of operating band reductions by the FCC. The equipment features sectionalized chassis construction, a tamper-proof i-f filter pretuned at the factory, complete 6-12 volt convertibility, and vibrator power supply. Both Carfone-450 mobile units and stations are available with either standard .0015% or even .0005% stability.

A major operational feature of all RCA mobile radio equipment is complete 6-12 volt convertibility which permits conversion in the field for operation on either 6-volt or 12-volt automobile batteries. Conversions can be effected with no modification costs, except in the case of the Fleetfone standard dynamotor-powered mobile radios. Conversion of these types requires only the substitution of the dynamotor and the use of two plugs to effect other circuit changes.

All RCA mobile radio equipment and base stations are available in a wide range of multiple-frequency combinations, from single transmit, single receive to dual transmit and dual receive. In addition, all 60-watt and 250-watt base stations can be selected with multiple-frequency combinations incorporating up to triple transmit and dual receive.

RCA Fleetfone and Carfone-150  
(Continued on Page 45)

RCA CMV 60 Watt—watt mobile radio equipment.







Police Chief D'Orsi, Parsippany-Troy Hills (N. J.) demonstrates DuMont mobile radio equipment specially installed in glove compartment.

In the two years since Allen B. DuMont Laboratories, Inc., announced its entry into the field of mobile radio, the company which pioneered television has moved rapidly ahead to become one of the mobile radio industry's leading manufacturers.

In twenty four months DuMont has engineered and produced sixteen basic mobile radio communication units including radios for the 25-54 mc, 144-174 mc, and 450-470 mc ranges, as well as base station transmitters and control equipment for the same frequencies. More than twenty units of associated and accessory mobile equipment were also introduced.

A typical DuMont mobile installation is that used by the Township of Parsippany-Troy Hills, a rapidly growing community in the residential and industrial area of northern New Jersey, approximately 26 miles from New York City.

Par-Troy, as the township is called by many, has coordinated its mobile system so that, in addition to the police, it may be used by township officials and departmental workers for many functions including that of civil

# The DUMONT Story



defense. In fact, all of the municipal vehicles are integrated into the system.

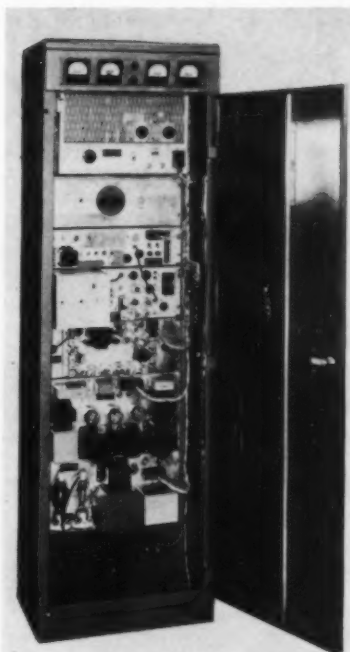
Parsippany-Troy Hills Township is a busy community that is sharing in the tremendous recent growth of communities near New York City. Due to its integrated community mobile radio network, it expects to handle the many problems incident to that growth more easily.

"Par-Troy" has a population of 18,000 in an area of approximately 27 square miles of rolling and hilly terrain extending from a sea level to a 1500-foot high ridge across intervening hills. The radio system nevertheless provides strong clear signals throughout the area.

By making the service available for civilian defense use, the community took advantage of the federal government's matching fund plan under which the government paid half of the cost of the system. The total cost was approximately \$7,500. Operating costs are estimated at \$500 annually.

The Par-Troy township hall, site of police headquarters, has microphones and loudspeakers in various key offices. Mobile two-way units have been installed in ten vehicles. The system has already been given its "baptism of fire" in a wide-spread mountain forest fire that was controlled through coordination by radio of police and township radio-equipped vehicles.

In the township hall, two-way units are located in the office of the police chief, at the police desk, the central telephone switchboard, department of public works, the office of the town-



A 250 two-way radio base station Model MCA 152 A.

ship manager and the office of his assistant. All these units, except the police chief's, operate on dual frequency and can transmit and receive on both the township frequency and the adjoining Morris County police network.

The DuMont installation has proved highly effective because it allows maximum use of vehicular equipment. The entire township administrative staff is linked efficiently for instant communication on important problems and decisions. For example, if police spot a broken water main, or some highway obstruction which needs immediate attention, the information can be immediately relayed to the proper authority. Police, fire, and ambulance work are greatly aided by the dual-frequency tie-in with the Morris County network.

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Sgt. Charles Wagner of Parsippany-Troy Hills Police operates the Par-Troy Municipal radio system which provides two way communications linking all departments of the township.



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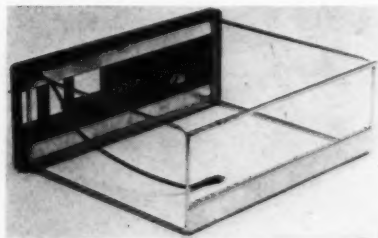
# The GENERAL ELECTRIC Story

by David O. Moreton, Technical Editor



In the years since World War II the use of low band 25 to 50 megacycle and high band 152-174 megacycle frequencies by Police Departments and other users has increased tenfold. This expansion of use has resulted in an increasingly crowded condition in the assigned frequency spectrum. Manufacturers of mobile radio equipment such as General Electric, Motorola, R.C.A., Hallicrafters, Link Radio, Federal Telephone and Radio, Industrial Radio Corporation, DuMont, and Bendix Radio have been called upon to supply equipment capable of good communication under these increasingly crowded spectrum conditions.

After solving the numerous complex technical problems imposed by the expansion of use and resultant crowding, the companies have been



A relay rack inside the G-E Progress Line mobile housings provides a new method of mounting transmitter, receiver and power supply.

called upon to supply an almost infinite variety of equipment. The equipment necessary to meet specific requirements as well as everyday needs of the nation's growing law enforcement departments imposed an additional burden upon the design departments. Equipment becomes even more widely divergent when you consider that in addition to various gen-

eral and special police departmental radio requirements, the problem grows with the additional requirements imposed by private and industrial use of mobile radio. Taxi cab companies, oil companies, fire departments, power utilities, construction companies, vet-



The G-E Standard 17" housing with front-mount.

erinarrians, doctors and industry have found increasing use for mobile radio making a complex problem even more complex.

In its simplest form a complete mobile radio unit consists of transmitter, a receiver and a power supply. These components operate in conjunction with one another, and generally speaking perform as follows: the power supply provides the electrical energy necessary for operation of both the receiver and transmitter. The receiver takes the signal picked up by the antenna and converts it into audible sound heard over a loud speaker. The transmitter takes the energy generated by the voice speaking into the microphone and converts it into energy that is radiated from the Broadcast antenna.

Speaking technically with regard to the operation of the receiver, it may be explained a little more fully without over complicating the circuitry that the signal that carries the message and that we eventually hear is known as the Radio Frequency or R.F.<sup>1</sup> Signal. This R.F. Signal is received by the antenna of the station which conveys the energy of this received signal to a low-noise Radio

Frequency Amplifier.<sup>2</sup> This low-noise radio frequency amplifier in turn sends the strengthened signal after rejection of spurious signals<sup>3</sup> to the intermediate frequency amplifier. The intermediate frequency amplifier then converts this strengthened signal into audible sound on the patrol car or station loud speaker. In general terms the operation of the usual transmitter is the reverse of that of the receiver with component differences. However, the final R.F. signal is much stronger when it leaves the antenna.

Ranking high among the achievements of the radio industry is that of the General Electric Company at Electronics Park in Syracuse, New York, in designing, for the first time to my knowledge, a complete line of mobile two-way radio communications equipment which has been specifically designed, from microphone to speaker, to meet the aforementioned widely divergent requirements. Aptly named by the staff of General Electric the new equipment is known as the "Progress Line". The General Electric "Progress Line" was designed around twelve basic units of standardized physical dimensions. The many mechanical and electronic advances incorporated into these units provide the user with improved performance and greatly simplified maintenance.

The 12 basic elements (units) of the



The G-E Progress Line control head and speaker may be mounted anywhere.

G. E. "Progress Line" may be compared to a child's set of building blocks. These 12 basic building blocks consist of two receiver units, four transmitter units and six power supply units. Taking these standard units

3. Spurious Signals—Reception in a radio receiver of one or more frequencies other than that to which it is tuned.

4. Chassis—The metal framework on which the parts of radio, TV and other electronic circuits are mounted. Also used to designate a radio or TV receiver before it is mounted in a cabinet.

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## Footnotes

1. R.F.—Radio Frequency—Specifically, that part of the general frequency spectrum between audio sound and infra-red light (about 10 kilocycles to 10,000,000 megacycles). Generally, an alternating current frequency whose electromagnetic field can be radiated over great distances.

2. Amplifier—A device of electronic components with or without vacuum tubes used to increase power, voltage or current of a signal.—Intermediate Frequency Amplifier—that section of a superheterodyne receiver which is designed to amplify signals with high efficiency at a predetermined frequency called this intermediate frequency of the receiver.



and combining them permits the individual purchaser or department to choose from sixty (60) standard mobile two-way radio combinations. Each unit or building block features the use of a plug-in chassis of standardized physical dimensions. Flexibility has been achieved by designing each of the chassis so that it is completely interchangeable with other units of its type mounted in either a base station or in the patrol car.

G.E.'s engineers designed two standard housings for the progress line, differing from one another only in the width dimension. The housings are dustproof and feature drawer-type construction with lift-up covers.

All of the G.E. Progress Line receivers (high, or low band, mobile or base station receivers) are physically interchangeable because of their plug-in connections. All will operate from either six or twelve volt D.C. power or from a 117 volt A.C. power supply without modification of any kind. This feature eliminates the need for storage batteries or rectifier type power supplies for bench servicing of equipment. Receivers are available for either wide or narrow band operation. Conversion from one to the other can be performed in the field by adjusting the IF amplifier coil coupling.

The new "Progress Line" receivers all have five high-Q tuned circuits in the RF Amplifier, two of which are ahead of the first RF Grid. These pre-selector transformers are air-wound coils tuned by silver-plated, variable, air-trimmer capacitors. Each receiver uses a triple-tuned transformer between the RF Tube and the converter. The high band receivers use air-wound coils and ceramic trimmers, while the low band receiver uses a combination of adjustable iron-core coils and ceramic trimmers. The rejection of intermodulation interference provided by the new type tuned RF circuits used in the "Progress Line" in both the high and low frequency band receivers approaches the results previously obtained only by the use of large cavity filter assemblies.

Selectivity is determined by a 6-coil, 290 kc transformer in the high band receiver and by two such units in the low band receiver. Space is provided in the high band receiver for an additional 6-coil transformer if the present 60 kc channels are split into either 15 kc or 20 kc channels. If the channels are split into two 30 kc channels, the single 6 coil transformer will provide the required local area adjacent channel selectivity. The low IF 6-coil 290 kc transformer was chosen because it provides greater "skirt" selectivity, and wider pass band for weak signals, or split channel operation, which the Federal Com-

munications Commission is proposing for both high and low bands.

A new audio volume control permits a more precise degree of regulation of power output. At the same time the new control balances out hum and noise pickup while eliminating interaction between squelch and volume controls.

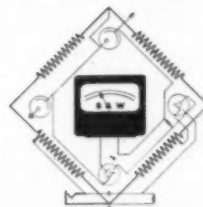
Like the receivers of the G.E. Progress Line the transmitter chassis are also plug-in units designed for high inter-changeability and use as mobile or base station installations. The physical layout and circuitry of both the high frequency and low frequency transmitter chassis are similar. The units are identical in design except for the final stages in both high frequency and low frequency. In the low frequency (25-54 mc) group two transmitters of medium power (27-33 watts output) and high power (54-82 watts output) are available. Of the two transmitters in the high frequency (144-174 mc) group one of medium power (20-25 watts output) and one of high power (40-50 watts output) are available.

Over-all frequency stability of .003 per cent over a temperature range of -30°C to +60°C has been accomplished without the use of heated crystals. As an option, however, unheated crystals providing a frequency stability of .002 per cent, or heated crystals insuring a frequency stability of .005 per cent will be supplied.

It is possible to obtain multi-frequency operation by the use of separate oscillators for each channel. The desired channel is selected by closing the cathode circuit of the proper oscillator. The use of this method of selection eliminates the effects of changing relay contact resistance and capacitance which is detrimental to the stability and reliability of the oscillator circuits. This

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is common when crystals switched with relays are used.

An important improvement which the G.E. "Progress Line" has contributed to mobile radio is in the field of speech intelligibility. This improvement is accomplished by designing the Progress Line transmitters with the audio amplifier stages so as to take the input of a controlled reluctance microphone. Normal intermodulation distortion has been cut from ten per cent to 1/2 of one per cent and harmonic distortion been cut from thirty per cent to ten percent by using the controlled reluctance microphone. A carbon type may be used but their greater distortion makes them less desirable.

The power supplies have been designed as basic building blocks to be used with the various mobile transmitter and receiver combinations. In both the 25-54 mc and the 144-174 mc bands there are medium and high power vibrator and high power dynamotor power supplies for use in mobile

(Continued on next page)

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### IMPROVED 1956 MODEL PORTABLE INFRA RED SIGHT

A new model has been developed with a transistor power supply. This gives an image of greater stability. This supply operates from 3 size "D" flashlight batteries. Since it contains no vacuum tubes nor vibrators it is extremely rugged and long lived. The supply is mounted in a black plastic case, 6 3/4" x 5 1/4" x 2 3/8". Weight 2 1/2 lbs. A shoulder strap is provided.

Light Sources. A 6 volt flashlight with infra red filter gives a suitable range for patrol use. When used with a motor vehicle, a strong spot light is desirable.

Write at once for more information.

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**General Electric** (From Page 33) radio units. To convert any of the units into inexpensive base stations there are medium power and high power A.C. power supplies. In addition there is a continuous duty base station receiver power supply and base station transmitter power supply available. Under normal service, the estimated vibrator life is 6,000 hours or better. The medium power vibrator supply uses a tapped, full bridge circuit with one transformer and one split reed, dual interrupter-type vibrator plus industrial-type, high temperature selenium rectifier cells. The high power vibrator power supply uses two transformers and two split reed, dual interruption type vibrators instead of one each as in the medium power unit. The elimination of tube rectifiers in the power supplies will provide longer service and less maintenance.

### High Power Reaches Out

During our visit at Electronics Park in Syracuse, we gathered the material for the G.E.'s 1956 Police Radio story. We talked with actual users of the "Progress Line" and its accessory equipment.

The system of the G.E. Engineers idea in using the building block principle is best shown by an actual case history. Sheriff Robert Sawyer of Whitesville, New York had a particular problem in maintaining contact with the other officers in Allegheny County. To understand this problem it is necessary to understand the topography of his area which is south and west of the Finger Lakes District on the New York-Pennsylvania border. This is rugged in that it is ridge country, ridges that for the most part run north and south. The towns and villages of Allegheny County are all situated in the valleys between these ridges. Thus Sheriff Sawyer in trying to contact Chief Hatch in Bolivar Village or Chief Childs in Andover by mobile radio must get his radio signal over these ridges and down into the valleys.



Until the new G.E. Progress Line high power equipment came along the Sheriff was isolated except for the telephone. Using the most powerful mobile equipment then available, his contact could only be called sporadic. Sixty watts proved inadequate, so that the G.E. Sales engineer in the area suggested the new high

power unit which at its peak is capable of better than 100 watts output. Shown here are pictures of Sheriff Sawyer's equipment which is installed in a 1955 Chevrolet. Sheriff Sawyer chose a trunk installation so that he could continue to use his car for



personal necessities without the inconvenience of having the equipment in the way. It is necessary for the sheriff to use his personal car for his official duties because Independence Township, in which Whitesville is located does not supply his transportation. The above photographs show Sheriff Sawyer's installation, he reported that when conditions were just right he has been able to reach out over the ridges and valleys as far as 55 miles and talk to the operator in Bath. Bath is the county seat of neighboring Steuben County.

### Mobile Radio & Selective Call at Parma, Ohio

The most interesting part of this General Electric field trip was the visit to Chief Lester Roeper of Parma, Ohio. Parma is a suburb of Cleveland, the Parma force numbering 34 works in close harmony with its bigger brother. An integrated system for radio communication has been set up utilizing the General Electric tone signal system. With this system it is possible for the dispatcher at headquarters in Cleveland to issue an "all cars bulletin" to each patrol car, suburban police headquarters and the Sheriff in Cuyahoga County. Utilizing this tone signal system permits the instant notification, by voice, of stolen cars, bank robberies or disasters. In the case of stolen cars it alerts all law enforcement personnel in Cuyahoga County to be on the look out for the particular car or cars. When a bank robbery occurs it implements setting up instantly road blocks throughout the whole county.

After Chief Roeper described the role of tone signalling equipment plays in his department and in Cuyahoga County, to demonstrate, he had his radio operator call a specific car using the selective call feature of the system. The car, 110, driven by Patrolman Alexander "Alex" Mabin soon reported to headquarters and we joined him to watch the system in actual operation.

When Chief Roeper signalled Patrolman Mabin, here is what happened.

He depressed a key in his headquarters transmitter set-up which issued a call note or tone (or a combination of tones) which was received only on Mabin's car radio, in this fashion.

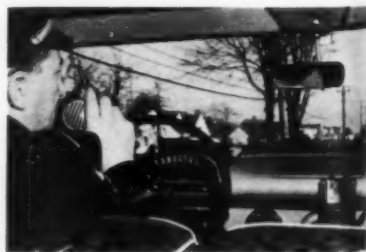
As you know, when you listen to radio although the carrier frequency is signal of tiny radio impulses of a fixed frequency which can be selected or tuned in on the receiving radio by adjustment to receive this particular fixed frequency, as selected from all other radio frequencies sending messages into the air, you can still hear on this carrier frequency as wide a variety of tones or sounds as an entire symphony orchestra. This variety of sounds is accomplished right on the fixed frequency by what radio men call a "modulation" which are really variations of the strength and intensity of that radio signal which is interpreted by the ear as music.

Tone signalling is based on the principle of selecting one tone or a combination of several tones and set-



ting up a radio receiver independent of the rest of the police radio system in the police car, which is responsive to only this tone or several tones.

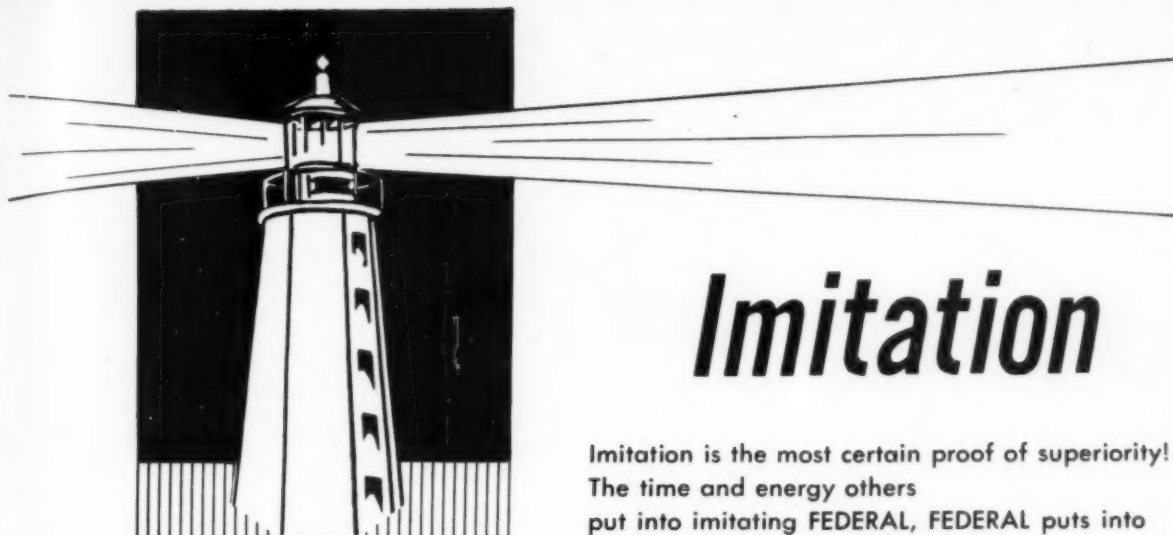
When radio frequencies are selected out of the air in a radio receiver, these tiny current impulses can be converted either into the power that drives the transformer in the radio loudspeaker and converts these signals into audio frequencies which we hear, or these same signals can be turned into power in a radio relay which will effect a mechanical action. In tone



signalling these tones are so used to trip a switch which will start the beacon light on the top of the police car flashing, or if this signal is already flashing, can be diverted to sound the horn on the car. These tones can be keyed exclusively to an individual car so that when that particular note or several notes are struck only one car will receive that signal.

(Continued on Page 42)





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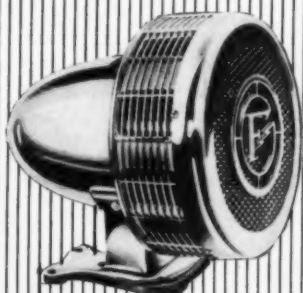
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POLICE  
RADIO**Police Radio 1956**

The January issue and particularly its Police Equipment News Department is making a special feature of "Police Radio 1956". Both in lead articles and Product News we have endeavored to present to the Police Chief "an exhibition in print" of the latest equipment from microphone to complete transmitter receiver systems as reported to LAW AND ORDER by a wide variety of manufacturers. This gives the reader an opportunity to study the newest developments in that very vital part of police work "Communications". A similar review will be done again in the January, 1957 issue.

**Directory**

The following firms supply equipment for radio communications. Listed by each name is a code letter indicating the items they can supply.

- A Antennas
- B Tubes for radio
- C Two-way radios and equipment
- D Microphones
- E Components for communications
- American Microphone Co.**, 370 South Fair Oaks Ave., Pasadena, Calif. Code D
- American Television and Radio Co.**, 300 E. 4th St., St. Paul 2, Minn. Code E
- Antenna Specialties Co.**, 12435 Euclid Ave., Cleveland 6, Ohio. Code A
- Avia Products Co.**, 7266 Beverly Blvd., Los Angeles 36, Calif. Code C
- Andrew Corporation**, 363 East 75th St., Chicago, Ill. Code A
- Bendix Radio Div.**, Bendix Aviation Corp., 2120 North Charles St., Baltimore, Md. Code C
- H. H. Buggie, Inc.**, Box 817, Toledo, Ohio. Code A
- Communications Co., Inc.**, Coral Gables, Miami 34, Florida. Code C
- Cornell Communications & Sales Co.**, 1340 Ford Rd., Lyndhurst, Ohio. Code C
- Allen B. DuMont Laboratories, Inc.**, 760 Bloomfield Ave., Clifton, N. J. Code C
- Eitel-McCullough, Inc.**, San Bruno, Calif. Code E
- Federal Telephone and Radio Co.**, 100 Kingsland Rd., Clifton, N. J. Code C
- General Electric Co.**, Communications Equipment Electronic Park, Syracuse, N. Y. Code C
- The Gonset Co.**, 801 Main Street, Burbank, Calif. Code E
- Hallcrafters**, 4401 West 5th Ave., Chicago 24, Ill. Code C

- Industrial Radio Sales**, 428 North Parkside, Chicago 44, Ill. Code C
- Kierulff Electronics, Inc.**, 820 West Olympic Blvd., Los Angeles 15, Cal. Code E
- Link Radio Corp.**, 110 Jericho Tnpk., New Hyde Park, N. Y.
- Master Mobile Mounts, Inc.**, 1306 Bond St., Los Angeles 15, Calif. Code E
- Monitoradio Div. I.D.E.A., Inc.**, 7900 Pendleton Pike, Indianapolis 26, Ind. Code E
- Motorola Communications and Electronics, Inc.**, 4501 W. Augusta Blvd., Chicago 51, Ill. Code C
- Radio Corp. of America**, Engineering Products Div., Camden, N. J. Code C
- Radio Specialty Mfg. Co.**, 2023 S. E. 6th Ave., Portland, Oregon. Code C
- Shure Brothers, Inc.**, 225 W. Huron St., Chicago 10, Ill. Code D
- University Loudspeakers**, 80 S. Kensico Ave., White Plains, N. Y. Code E



**American Television & Radio Co.**, 300 East 4th Street, St. Paul 1, Minn. announces new ATR Mighty Midget Inverters for portable use equipped with cigarette lighter cord sets.

These new ATR Mighty Midget Inverters are for use on 6 or 12 volt storage battery systems by simply plugging into the cigarette lighter receptacle on the dash and deliver 110 volt A. C. 60 cycles power with output as high as 110 watts.

This inverter has many uses. They are ideal for operating small tape recorders and similar electronic devices. On-the-spot reports of accidents and interrogation of witnesses may be done immediately while events are fresh in their minds.

Another use which is of great assistance to police work is to use the inverter in conjunction with the recording machine as an operator observer gives his reactions on traffic flow as he studies a special situation.

Robert A. Latimer, a free lance reporter describes a typical installation as follows:

The system is simple. I use a tape recorder, capable of accepting up to two hours of dictation on a single reel of plastic tape. This sits securely in place in the center of the front seat, on a plywood wedge which keeps it level. A leather belt around the machine passes between the folding seat backs

and is secured to the frame of the seat below; to prevent the recorder from plunging to the floor in the event a sudden stop is needed.

My power system is an ATR Model 12-RSD Inverter, a heavy, but compact unit which mounts under the dash. Supply cords from the inverter to the battery pass through a half-inch hole already present in the firewall of the car, which is a 1953 Olds 88. One cord is grounded to the engine block, and the other permanently attached to the positive plug of the battery, by means of a clamp pin and a hole drilled through the lead battery post. The car of course features a 12-volt battery system, which puts more "muscle" in the electrical service, and which I can recommend highly for meeting the extra load of hours of dictation.

A switch on the inverter itself provides 110-volt current for operating the recorder, while a four-position knob varies the output as required, for dictating when the engine is off, or when in transit. To date, I have found that the unit puts out a smooth 110-volt power supply, at 100 watts or better, which is more than adequate to keep the recorder turning at the lowest power output setting. Incidentally, this is the second inverter I have used, the first in continuous use until I bought the new automobile, with its 12-volt system necessitating a 12-volt conversion in place of the 6-volt unit used before. This is the type of installation used for two years by John Spargo, New England Manager of LAW AND ORDER.

All ATR Inverters are exceptionally well filtered to insure interference free radio reception. With ATR Inverters the need for special equipment is eliminated. They are designed for quiet long life operation. All models come equipped with four-point voltage regulators which make it possible to correct the output voltage for minimum to maximum loads and also helps compensate for input voltages which are lower or higher than normal. The operating efficiency is in excess of 75%. To figure approximate current consumption from storage battery, divide the rated input wattage of the recorder (or load) being operated by the storage battery voltage and further divide this answer by .75 which will give the actual current consumption based on the actual load and efficiency. The battery current consumption required for a tape recorder is normally less than that drawn by ordinary automobile headlights. These tape recorder inverters are recommended only for use with loads having power factors in excess of 70%.



## Police Radio System

Link Radio Corporation, 110 Jericho Turnpike, New Hyde Park, L. I., N. Y. presents a Radio Transmitter-Receiver of single unit construction, Model



2365-M-Ed. 8. It is a frequency-modulated transmitter, receiver with a universal vibrator power supply. By combining all functions on a single chassis 17" long x 8" wide x 6" high, the manufacturer claims optimum performance with small size. The unit is designed for either front or rear mounting and may be used on either 6 or 12 volts without wiring, component or cable changes. Change over from 6 to 12 volts is accomplished merely by shifting a plug located on the top of the chassis. The receiver is designed for operation in the split-channel service, as well as the standard 40 KC channels. The unit is available on special order equipped with oven-type crystals which increases the frequency stability of the transmitter-receiver to .0005% over a temperature range of -20 degree C to +85 degree C.

## "Pak-Fone" Two-Way Portable Radio

Industrial Radio Corporation, 428 North Parkside Avenue, Chicago 44, Illinois, have a unit of communication for Police Departments.



Police Departments can use this new 2-way radio in vehicles, as a base station or as a portable unit when operated from its self-contained batteries. The Model A Universal Pak-Fone operates from 6, 12, or 24 volts

DC current or from 117 volts AC sources without a separate power supply. It is 5½ inches wide, 10½ inches long, and 13½ inches high.

The case of the Model A Universal is constructed of reinforced steel and weatherproofed for outdoor use. Both loud speaker and power supply are built in. Microphone, antenna and batteries are standard equipment. Heavy duty, all-weather carrying case with shoulder straps is an accessory so designed that unit may be operated while in case.

Frequency modulation and a relay type squelch circuit provide clear, noise-free telephone communications. A total of 21 or 23 tubes and crystal controlled stability provide reliable performance.

Model A Universal Pak-Fones carry FCC and FCDA designations. They operate in 25 to 50 mc and 145 to 174 mc bands.

Industrial Radio Corporation will furnish full information.



American Microphone Company, 370 South Fair Oaks Avenue, Pasadena 1, California. Model 501 Series is a popular microphone for communication application. This company manufactures replacement models for Motorola, GE, RCA, Bendix, DuMont and Link. They have available models with a straight cord with no plug and a model with a Kollid Kord with no plug which allows installation of any plug of the user's choice.

The most recent microphone development for mobile communications is model C504C. This is a carbon microphone of rugged construction designed primarily for use on motorcycle two way equipment. The C504C is a carbon microphone with high output and is used as a close talking microphone. The switch designed on this microphone is extremely functional and of rugged design. The microphone is 2½" in diameter and 1⅞" thick. This is a pleasing size for use by motorcycle officers even while wearing gloves. The switch assembly is protected by a rubber boot and the entire microphone is moisture proof.

This company also manufactures microphones for station use and also

special dynamic microphones or small size for dictograph or "bugging" purposes. The American Microphone Company is an affiliate of the Elgin National Watch Company.

## Announcing Speakers

A new concept in wide angle paging and announcing speaker design recently developed by University Loudspeakers, Inc. of White Plains, New York has been incorporated in 2 new models introduced by this concern. The Model CIB and the Model CMIL both feature a reflexed "cobra" air column for wide angle horizontal dispersion of sound. Designed for General and Mobile Public Address use with efficient, crisp, clear reproduction of speech... these speakers are ruggedly constructed for uninterrupted heavy



duty, and are designed to function reliably in any sort of weather or in noisy, dusty and wet locations.

The Model CIB comprises a built-in hermetically sealed driver unit integrally assembled to a reflex air column terminating in a cobra shaped wide angle bell. The cobra bell is a one-piece mold of fiberglass reinforced polyester resin. The driver unit employs a "rim centered" linen-base one-piece molded phenolic diaphragm and a voice coil treated with an anti-fungus compound for complete weatherproofing. The magnetic assembly uses the exclusive vibration-proof "W" shaped Gold Dot Alnico 5 magnet.

All exposed metal surfaces are electro-chemically plated against corrosion and finished in grey peel-proof baked enamel. Speaker uses a "positive-lock" adjustable, serrated die-cast aluminum bracket for mounting.

The CIB is rated at 12 watts continuous duty with a response of 300 to 13,000 cps. Horizontal dispersion of sound is 120°, vertical dispersion 60°. It measures 7¼" high x 14" wide x 12" deep. Free illustrated brochure sent on request. Write to Desk LO-1, University Loudspeakers, Inc., 80 South Kensico Avenue, White Plains, N. Y.

## "Helix" Cable

Andrew Corporation of Chicago has announced a new and truly flexible air dielectric cable especially suitable for police radio base stations.



This new cable, called HELIAX, is receiving industry wide acceptance. This is easy to understand, when you consider that this flexible air dielectric cable offers electrical performance equal to that of the finest copper cables, yet is far lower in price and much easier to install.

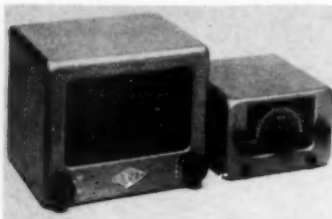
HELIAX has its own complete series of connectors, matching the quality electrical performance of the cable. These fittings are pressurized and weatherproofed, and attach easily without special tools.

For convenience in field use, HELIAX is normally supplied in complete assemblies, with end fittings factory attached. It is available in  $\frac{7}{8}$ " and  $1\frac{1}{2}$ " sizes, in continuous lengths up to 3,000 feet.

Police radio supervisors may obtain full technical data and free sample of this cable by writing Andrew Corporation, 363 E. 75th Street, Chicago 19.

### Power Supply—FM Tuner

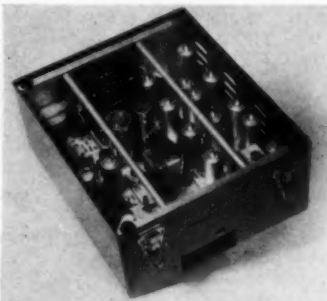
The Gonset Company, 801 Main Street, Burbank, California, manufactures an Audio Amplifier-Power Supply and Commercial Type-FM



Tuner. The Audio Amplifier-Power Supply is designed to supply output audio and power for tuners with low-level audio outputs. This unit has a built-in PM panel speaker, audio gain and tone controls; the unit is  $6\frac{1}{4}$  inches deep, 7 inches wide and  $6\frac{1}{4}$  inches high. The FM Tuner provides a sensitive and stable receiver when used in conjunction with ordinary auto and communication receivers or with the above Audio Amplifier unit. These tuners include squelch and noise clipper, I.F., and low-level audio. Unit mounts on the steering post or under the dashboard.

### Airport Police Radio

Communications Company, Incorporated, Coral Gables, Miami 34, Florida, manufactures the Comco Controller Model 278-E-6/12-2 which is designed primarily for Airport Police. This equipment has a frequency range of from 118 to 152 MC. crystal controlled with a maximum spread of 500 Kc. Single or dual channel units are available for mobile (vehicular),



portable (hand carried) and console (desk) use and the units also meet Federal Civil Defense Administration specifications. Units draw 10 amperes at 6 volts or 5 amperes at 12 volts on standby and 15 amperes at 6 volts and 7.5 amperes at 12 volts transmitting. The Comco units use 6 volt tube types and change over from 6 to 12 volts requires no tube change. A series/parallel filament arrangement is automatically changed by the 6/12 volt primary plug. This arrangement simplifies tube stock with mixed fleets.

### "Trafficmaster"

The Bendix Radio, Division of Bendix Aviation Corp. of Baltimore, Md., manufactures the TRAFFICMASTER. This unit is a complete, self-contained 12 vdc mobile communications unit operating in the frequency range from 144 to 174 megacycles and is available with either 35 or 60 watts Power Output. It is completely interchangeable with new Bendix 6/12 volt mobile units and with all earlier Bendix MRT6, 12 volt equipment with only very simple jumper changes in the control head or cables of the system in which it is installed.

It is specifically designed for mobile 2-way communication service and may be used for other types of service if desired. Easily portable, the unit can be mounted in relatively inaccessible locations. It can be removed easily from the splashproof housing and is equipped with a tumbler type key



lock to prevent unauthorized entry.

The TRAFFICMASTER, Bendix says, meets or exceeds all present specifications as set forth by the F.C.C. and R.E.T.M.A. for general mobile type operations.

It features the following: 144-174 Megacycles, 35 or 60 Watts RF Output, Extra Heavy Duty Vibrator Power Supply, Selectivity -100 DB @ +30KC, .6 Micro-volt Receiver Sensitivity, Four Watt Audio Output, Continuously Adjustable Squelch and Volume, Single or Dual Frequency Operation, Directly Interchangeable with 6/12 or early 12 volt Bendix Units and High Side Transmitter Keying.

### Mobile Antenna

Corrosive atmospheric elements prevalent throughout various sections of the country have no effect upon the quality VHF Mobile Antenna engineered and manufactured by H. H.

Buggie, Inc., Toledo, Ohio. Also, strain, stress and vibration created by moving vehicles are minimized by quality materials and careful workmanship. The result is a finished product that actually improves radio reception and adds longer periods of satisfactory operating life.

The HHB antenna was developed at the request of a leading telephone equipment company to fulfill the need

for a unit that would withstand mobile requirements and minimize maintenance. Today, many of these antennas have been adopted by municipalities throughout the country.

The mast and exposed hardware are made from stainless steel that will resist the corrosive action of salt spray or other hazardous elements that are found in the atmosphere. The tip of the mast is equipped with a metal ball to give extra durability, and a finished appearance to the antenna installation.

The mast is set into the mounting base with H. H. Buggie 707 compound. This compound provides a means for flexible attachment to the base, as well as for insulating the antenna from the vehicle.

The mounting base assembly requires only one hole for mounting. Twelve feet of RG 58/U cable is permanently attached to the base.





### Monitor Radio Unit

**Radio Apparatus Corporation, 7900 Pendleton Pike, Indianapolis, Indiana.** A high quality mobile FM crystal controlled receiver for monitoring is offered by this company. Model FMC1-L and Model FMC1-H are two units that are invaluable as additional receivers for separate frequency channel monitoring to supplement two way



radio communication systems. They are ideal as monitors of two way systems in mobile units not requiring a transmitter. Perfect for dispatching service cars, ambulances, trucks, civil defense personnel, special police and many others or may be used as a walkie-talkie monitor. They can be used for inter-com between vehicles

on two frequency systems. All units are shipped with crystal installed to order and aligned to frequency. Single frequency 30-50 mc for Model FMC1-L and single frequency 147-174 mc for Model FMC1-H.

### Two Police Radio Systems

Two new compact Mobile Radio Transmitter and Receiver units designed for Police Radio Systems have been announced by **Federal Telephone and Radio Company, 100 Kingsland Road, Clifton, New Jersey**, a division of International Telephone and Telegraph Corporation.

The **FEDERAL FT 159**, supplied as a 30 or 60 Watt unit for operation in the 25-50 MC range, is designed for 6 Volt, 12 Volt or 6/12 Volt operation. This unit is most commonly used by state and county police departments or by municipal agencies requiring 25-50 mile coverage.

The **FEDERAL FT 160** is supplied as a 30 or 60 Watt unit for operation in the 148-174 MC range. It is also designed for 6 Volt, 12 Volt or 6/12 Volt operation. The FT 160 is used primarily by the large municipalities

in urban areas where 15-25 mile coverage is sufficient.

Power supplies and accessories of both the FT 159 and FT 160 are identical and allow the economies of larger quantity manufacture to be passed on to the user. The 6/12 Volt models of this equipment can be used interchangeably in either a 6 Volt or 12 Volt vehicle. No wiring changes are required.

Both of the units have been designed for ease of conversion to split channel operation.

The basic mobile receiver and transmitter sections feature complete interchangeability with similar units in the base station. This feature minimizes base station "down time" by allowing rapid substitution of spare mobile units in event of a major failure in the base station. Similarly the requirements of stocked spare parts are kept to a minimum.

Other new equipment in **FEDERAL** line of mobile radio equipment, the equipment "Certified By A World of Research", include the associated desk or floor mounted base stations and remote control units.

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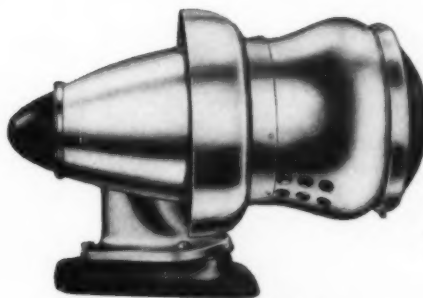
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## Microphone Technique

by  
**VICTOR MACHIN, Vice President  
Shure Brothers**



PAINSTAKING EFFORT is put into the engineering of every component going into mobile radio communications equipment . . . untold engineering talent is devoted to the design of these components into an effective receiver and transmitter . . . engineering man hours are wisely expended in the welding of microphones, transmitters, antennas, and receivers into a smoothly functioning system . . . considerable care is taken in the instructions for operation and maintenance of this equipment. It would seem everything possible has been done to maintain a high quality of performance. What more is there to do?

We have tended to overlook the fact that any system, no matter how well engineered, is heavily dependent upon what is put into it. The point of entry is the microphone. Everybody but the extremely hardened microphone engineer winces at the abuses

inflicted upon this defenseless device, whose primary function is that of a transducer—converting a sound wave to an equivalent electrical variation.

It is assailed by a bellow, or tickled, or by a whisper; it is swallowed or held at an aloof arm's length; it is subjected to a strange conglomeration of sounds . . . from your tongue caught in loose bridge work, or your cheek full of a wad of chewing gum; the microphone must react to the squeak of a contralto, or the boom of a human base fiddle. This might sound humorously fantastic. But it is not so humorous and not so fantastic in this hard-headed business of two-way communications.

This lack of education on the proper use of a microphone is a fault that begins with the microphone manufacturer and is duplicated through every channel to the ultimate operator. Let's turn a new leaf: let's professionalize our microphone technique.

To do this, we must recognize the limitations of a microphone. The fundamental limitation of a microphone is also an asset dependent upon your objective. A microphone is a monaural device, translating into an electrical equivalent whatever strikes its diaphragm—whether it is undesired sound (which we call noise) or desired sound, representing the intelligence we wish to transmit. It is apparent that the microphone has no selective mechanism for rejecting noises falling within the pre-determined frequency range of the microphone. It has no automatic tone control or volume control for instantaneous adjustment to the extreme ranges of the human voice. It has no unscrambling or decoding device to correct slurred or omitted words. Therein lies the limitation of the microphone.

For comparison, let us consider a very amazing sound pickup device—the human ear. The ears with their supporting mechanism . . . the eyes and the brain . . . give us a binaural system of reproduction. This human system, when in personal contact with the original sound source, gives us a sense of direction and realism. It can reject, to a large degree, wide dynamic and tonal ranges. It even can fill in a certain degree of omission.

The facility of this system can be effectively demonstrated in a noisy room by first using the ears, the eyes, and mental concentration to pick up the intelligence you want; then close off one ear, close the eyes and relax your mental concentration. The change is dramatic—you pick up a confused babel of sounds much as does the microphone.

How then can we compensate for this serious limitation of the microphone? The basic solution to the noise problem in voice transmission is to maintain as high a ratio of the desired sound to noise as possible. Broadcast

studios expend considerable time and money to achieve satisfactory sound transmission. Probably the best approach would be the same proper design and control of the reflecting and absorbing surfaces of the walls and ceilings within the transmitting room. Where possible, this should be done. However, this procedure does not usually fall within your budget. What then? How to maintain an optimum ratio of desired sound to noise? First, reduce the gain of the amplifier which will reduce the pickup of undesirable sounds. Have the operator work as close to the microphone as is practicable—no more than 12" from the microphone face. This will compensate for the reduced gain of the amplifier and result in an increased ratio of desired sound to noise.

However, in itself, this is not sufficient if the desired signal is distorted. Any noise level inflicted on a distorted signal results in a considerable loss of intelligibility. First and most important, the operator should speak naturally at normal voice levels. If necessary, he should work closer to the microphone. A tense, strained voice reduces intelligibility. An unnaturally loud voice results in over-modulation and distortion. The operator should speak slowly and distinctly. His prime objective is transfer of information. Theatrics and 10-11 delivery should be left to the disc jockeys and sports announcers.

Consider the position of your microphone. Don't face it toward major sources of noise if you can help it. Such sources are: windows opening into busy streets; elevated structures; court yards; doors opening into other offices. Don't place the microphone face close to hard-surfaced, reverberant walls. If noise is present from adjacent desks or work areas, consider partitioning off the microphone working-area with acoustical material.

Where the voice of an operator is inherently bad for clean, intelligible transmission—experiment! As an illustration, let us assume that an operator has a very high-pitched voice which plays tricks with the fixed response pattern of your system. Instead of having the operator speak directly into the face of the microphone, rotate the microphone so that he is speaking at some angle. Usually the greater the angle, the greater the drop in high frequency output of the microphone.

Much of the success in developing a professional microphone technique depends upon active cooperation between the operators at base and mobile stations. Take the time to determine the proper position and speaking voice for you. Constructive criticism among operators can only result in more efficient use of two-way radio.

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In considering microphone technique, some consideration may have to be given to the pickup pattern of the microphone in use. Microphone pickup patterns are generally classified as non-directional, bi-directional, semi-directional, or uni-directional.

The non-directional microphone picks up sound over a 360° range with equal intensity. This simply means that, regardless of the direction of the sound or noise source, the microphone will pick up or reproduce equally well. While this is an asset in the measurement of ambient noise or in audience participation shows, it is a definite disadvantage in two-way communications.

Then we have the bi-directional microphone which picks up sound equally well at the back or front, but is relatively insensitive at the sides—a "figure 8" pickup pattern. While this type of microphone provides a more selective pickup pattern, its chief asset is where it is desirable to pick up both the performer and the audience reaction to that performer or certain "specialty acts." This pattern has limited usage in two-way communications.

The semi-directional microphone, however, is widely used. You will note that (at the lower frequencies) this type of microphone has what approximates a non-directional pickup pattern; but nevertheless there is some sensitivity reduction at the back. At the higher frequencies, the pickup pattern approaches that of a cardioid or directional microphone which we will discuss later. You will note that this microphone at higher frequencies has good sensitivity to these high frequencies if they are approaching directly at the front of the microphone. There is a reduction of sensitivity to high frequency sound approaching from the sides and even more so to such sounds approaching from the back.

This knowledge of the characteristics of a semi-directional microphone can be used to advantage in reducing transmission of high frequency noises. Position the microphone so that the back or the sides (the areas of lower sensitivity) are towards the offending noise. It is this characteristic also that permits you to control, to some extent, the high pitched voice of an operator. With the operator talking into the side, the microphone will discriminate somewhat against the objectional high pitched tones in the voice; but it will pick up, with no noticeable loss, the lower tones of that voice.

While the semi-directional microphone can satisfactorily be used in the majority of installations, there are times when noise conditions are such that only a uni-directional or cardioid microphone can satisfactorily be used. The word uni-directional refers to the microphone's tendency to reproduce sounds coming principally

from one direction. The word "cardioid" refers to the pickup pattern—which is a cardioid or heart-shaped pickup pattern.

If we assume that those sounds approaching directly to the front of the microphone are picked up with 100% efficiency, then those sounds approaching at an angle of 60° to the front are picked up with only 75% efficiency; at an angle of 90° the sounds are picked up with only 50% efficiency. As you approach the back of the microphone, the sensitivity drops very rapidly. This characteristic is independent of frequency, unlike the semi-directional microphone, which is dependent upon frequency.

By utilizing this cardioid pattern, one can effectively reduce transmission

of objectionable room noise and thus provide more intelligibility of the desired signal.

Last but not the least of the considerations, is the physical handling of the microphone. Treat it as you would any professional instrument—don't abuse it; don't drop it; don't pound it.

Then, too, the little things count—oil that squeaky chair; don't tap code on the microphone or desk. Concentrate on the message.

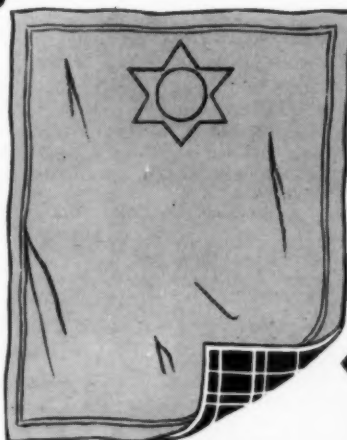
With proper operator technique and the proper microphone for the job, you can take great strides toward professionalizing this mighty important business of two-way radio communications!

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For further information circle #26 on R. S. Card

**General Electric . . . (From Page 34)**

and respond to it. A different note will be received by a different car. Yet all this is accomplished within the frequency assigned to your police broadcasting station for general communication purposes.

The General Electric "Progress Line" radio does not use a mechanical tone, but an electronic one. The musical note achieved by a trumpet or a piano key is a vibration which in and of itself is full of many imperfections and there is rather a wide range of sound between the time that the vibration starts and ends. An electronic tone is a very precise signal which eliminates these variations and permits a much wider and larger selection and greater accuracy so that if some false or very close sound slips into the broadcasting frequency, it does not trip off the dome light or horn by mistake. We had the opportunity to see this system actually work.

As we resumed patrol, Patrolman Mabin explained that during a regular daylight duty only one man rides in each car and the tour covers from 65 to 100 miles depending upon the action. During our discussion, KQA 550, which are the call letters of the Cleveland Police Base station, broadcast an "all cars bulletin". This call went to all stations and patrol cars in the county giving a "Stolen Auto List."

After noting the stolen car list Patrolman Mabin continued his explanation. "On night patrol we use two men to a car." With the selective call system it is possible for both men to leave the patrol car and investigate an alley, or other suspicious scene. We report our location to the dispatcher who if he must reach us in a hurry hits our re-call button. When the signal goes out it lights our dome light at night advising us or if we have the dome signal on already, the tone blows the horn and keeps the horn blowing until we come back and turn the control switch off. Since the patrol was quiet we re-

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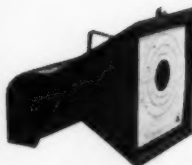
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quested an actual demonstration of this system and Patrolman Mabin called KQB 344 the Parma base station requesting a tone control check. Mounted on the dashboard of his patrol car is the selective call control panel. On the top of this box from left to right are the call indicator light and the selector switch which controls the dome light and the horn. The toggle switch on the front of the panel is the reset switch. The other photograph shows the Parma dispatcher answering the telephone at the switchboard and reaching for the

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microphone to call a patrol car to answer the incoming complaint.

Part of the mobile radio installation carried in Mabin's car is a special tone receiver. This receiver is pre-set to receive an electronic tone of a specific frequency and tone amplitude. Upon receipt of the car's assigned tone or combination of tones, in the larger systems, the receiver triggers a relay which actuates the control switch of dome light or horn. If the dome light is already lit the horn is blown, otherwise the light goes on. Upon transmission of the tone signal the horn started to blow and Patrolman Mabin then turned it off. At the end of the patrol we returned to headquarters with Patrolman Mabin and rejoined Chief Roeper in his office. The chief further explained the role of communications in his department. Parma, he explained, services 7 neighboring communities, but, he went on, each community has its own mobile license. At Parma they have a total of 10 cars on the Tone control or selective call system, eight of these are patrol cars and the other two are the repair truck and Detective's car.

Chief Roeper explained the recall system that they use for the detective car and how the antenna is disguised. When the detectives leave the car, the recall either actuates the horn or the parking lights. If the men do not want the noise of the horn, the parking lights flashing promptly advises of the call from headquarters. The chief pointed out that the antenna of the detectives car looks like any other car antenna thus it does not draw attention to the car. Chief Roeper mentioned that to his knowledge his was the only department in which every man including himself holds an F.C.C. license to operate a base station as well as mobile equipment. Thus he pointed out that in an emergency any man on the force can step in and act as operator and dispatcher of the base station equipment.

After leaving Chief Roeper, the General Electric field engineer Peter

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H. Bliss showed me the demonstration installation in his car. He explained the general mobile radio system in the area in the same manner as Chief Roeper but he introduced an additional facet to the system. The county sheriffs as well as some other departments who wished to maintain contact with the activities of other departments, while not necessarily talking with other than their own headquarters have installed simultaneous monitoring units in their cars.

Simultaneous monitoring requires the installation of an additional receiver of the desired department's frequency thus each car has two receivers in operation at the same time. With a special switch in operation it is possible to hear two dispatchers at one time and if something comes up, the operator can switch over to one receiver (his departments channel or frequency) and listen and talk to his department. In many cases the base

(Continued on Page 45)

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**Motorola** . . . . . (From Page 29)  
(0.10 microvolt in 25-54 mc. receivers) assures reception of even weak fringe area messages, and high stability prevents annoying momentary noise bursts when battery voltage fluctuates with engine speed.

An "anti-clamp" circuit (patent pending) distinguishes voice modulation from noise at all times, and prevents the squelch circuit from "clamping" or blocking when voice is transmitted over a very weak or very strong carrier signal.

### "Split-Channel" Operation

Serious consideration by the Federal Communications Commission to reduce the amount of frequency spectrum allowed each channel in the 25-54 mc. and 144-174 mc. bands has emphasized the importance of easy conversion to narrower channel operations.

"Twin-V" radiophones are easily converted by a simple screwdriver adjustment of the Instantaneous Deviation Control on the transmitter, and changing the packaged "Permakay" filter and a few resistors in the receiver. The complete conversion can be accomplished in 15 to 30 minutes and the modified receiver will meet or exceed "split-channel" performance requirements.

The "Permakay" filter provides the extremely stable selectivity necessary for "split-channel" operation. Guar-

anteed for the life of the receiver the "Permakay" filter never needs tuning or adjusting.

### High Receiver Sensitivity

New tube types have further increased receiver sensitivity, extending the communications range, enlarging the total area coverage and improving "fringe" area reception. Tubes are operated well below peak ratings to extend service life.

### Single-Scale Plug-In Metering

All circuits essential to tuning and checking are connected to two multi-pin metering connector for ease in servicing. A single-scale meter with a metering plug and rotary switch can be used to meter all circuits. Minimum test equipment is required in the field and in the shop.

### Rugged Construction

Chassis are constructed from heavy steel and have four sides for maximum rigidity. All components are firmly mounted to withstand the severe shock and vibration of mobile service. The basic radio set is packaged in a drawer type unit which can be key-locked in the housing. Power and control plugs won't shake loose.

### Complete Selection

Models are available for every application in the 25-54 mc., 144-174 mc., and 450-470 mc. frequency bands.

Model variations include R F power output from 1.5 to a full 60 watts, all-vibrator and dynamotor-vibrator power supplies, and a selection of channel widths including "split-channel" models in the 25-54 mc. and 144-174 mc. bands.

### Model Interchangeability

"Twin-V" radiophones are interchangeable with earlier Motorola models of the same general type. They are directly interchangeable with earlier "universal 6/12 volts models. A "cable adapter" plug provides interchangeability with other preceding models.

### The Final Test

Getting the message through is the final test of the effectiveness of any mobile radio communications system. Any single favorable performance feature cannot make the best system; it is the engineering balance of all the most important operational and performance factors that results in the best overall communications system. Many of these factors can only be appreciated by an experienced engineer or technician at the outset, but they become obvious as the equipment is used and performance can be evaluated. "Twin-V" radiophones are designed to "get the message through" under all of the great variety of conditions encountered in mobile operations.

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- Detective Agency: "Psychologically, our Polygraph is worth \$10,000 just sitting in the office — aside from actually saving time and expense in our personnel investigations."
- Midwestern Police Chief: "We kept a log on our machine during the first three months of operation. In that short time, the manhour savings and dollar value of stolen goods recovered more than paid for our polygraph room, training the examiner, and the cost of the machine."
- Western Police Department: "Results obtained through the use of the Polygraph materially reduce manhours spent on investigations, and aid substantially in the quick elimination of innocent suspects in numerous cases."

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This view of a typical Polygraph interrogation room shows examiner determining truth or falsehood of subject's responses to questioning.





## General Electric (From Page 43)

station is able to contact the other department being monitored, either, direct or by relay, thus the man in field can sometimes talk to the other station thru his own base station. The use of simultaneous monitoring allows special operators and others to keep in touch with cooperating departments.

The equipment housing shown in picture is the seventeen inch model. This "Progress Line" housing provides space for tone signalling equipments. (The chassis space second from the left.) There are 156 possible tones per frequency and the fact that a number of tones can be used for one call permits a great number of individual combinations to be assigned.

The installation of this equipment becomes increasingly important from the viewpoint of efficient use of personnel and equipment in that a single vehicle or group of vehicles can be called to the exclusion of others on duty. Tone equipment permits the base station dispatcher to select and dispatch, allows mobile selection and indication, mobile dispatching and also selective recall.

Where cost is not an important consideration multiple tone can be employed, where a large number of different calls are required it becomes

necessary to use multiple tone. When cost is important and up to ten different calls are required single-tone systems are generally employed. A momentary burst of tone or tones is used to activate the tone receiver which in turn may perform a variety of operations, i.e. light lights, blow horn, etc.

Operational requirements for a tone-calling (selective call) system are exceedingly simple, consisting of an on indication or off at all other times. This extreme simplicity accounts for most of the design difficulties which have arisen from the effects of noise, voice and other tone signals. Tone can be transmitted in three forms: continuous, keyed or pulsed. The type 9 tone dispatcher shown in the photograph has two bar keys and ten push-buttons plus an on-off switch with indicator lights. These controls give two possible types of operation.

Springloaded pushbuttons can be used to key the transmitter, pulse the tone automatically and hold the transmitter on the air. Both bars key the transmitter without tone. This permits the station operator to use the system without tone and transmit voice. Using the selective buttons activates the selective call system. This type of arrangement is used where only a few cars have tone control. The equipment can also be supplied with

interlatching pushbuttons that lock down when depressed. The lower bar keys the transmitter only and the upper bar keys the transmitter with tone, automatically sending the tone pulse. A more convenient but less rapid dispatching arrangement is provided for use on a system that contacts a number of mobile units successively before changing calls. The tone-burst interval can be adjusted easily from one-half to two seconds. This may be necessary if terrain problems require a longer time for the patrol to receive a strong enough signal.

## RCA (From Page 30)

systems utilize RCA's Groundplane antenna which is designed to provide a circular, low-angle, high-efficiency radiation pattern.

In addition to a variety of other antennas and other accessory items, RCA equipment for police communications includes a remote control unit (Type CC-8A) which can be used for remote operation of all types of RCA Fleetphone and Carfone systems. The remote control permits location of the transmitter-receiver up to 10 miles away, to utilize higher buildings or elevations for maximum signal coverage and reception.

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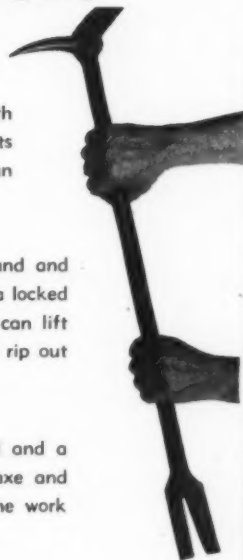
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For further information circle #15 on Readers Service Card



# From the Editor

A FEW MONTHS AGO we received a letter from a Trooper of a neighboring state. Enclosed were three newspaper clippings—two of which reported how he and his partner caught a speeder who had an army carbine on the rear seat of the car. To overtake the speeder it was necessary for the Trooper's car to hit 120 miles per hour. The time was 2 A.M. in the morning.

The third clipping was an editorial from the local newspaper "blasting" the Troopers for endangering their lives and the life of any innocent driver who might blindly turn into the highway from a side street.

Naturally the Trooper was greatly disturbed by the newspaper's attitude. After risking his life in the performance of his sworn duty to enforce the law, he finds his action subjected to adverse criticism.

The exact situation was repeated here in New York, November 20th. A pair of mobile patrolmen in a squad car chased two youths (driving a stolen car) for eighteen miles along the Brooklyn Belt Parkway and thru the tunnel to Manhattan. At times the officer's car reached over the hundred mark.

The newspaper reporting the incident accented the modern equipment which the New York City Police Motor Cycle Squad now use to enforce the law. It even quoted one of the apprehended men as saying, "I don't know what you cops have in those new radio cars, but we were doing better than 110 miles per hour."

This is a classic example of two types of reporting. The latter aided law enforcement by publicizing the

LEE E. LAWDER



fact that speeders can't "run-away" from the police. The first example condemned the police, thus doing nothing for law enforcement. It intimates that the speeder should be left to speed!

Most departments frown on the practice of their men risking their lives chasing a speeder. They say "Get the license number" and the radio will get the name of the owner. It is a simple matter to pick him up without risk.

However, each case is dependent on the judgment of the officer. In our December issue Chief McGranaghan in his article points out the fact that a policeman is "on his own." He has no foreman to whom he can run and ask advice. His decisions must be made at the moment.

Had the Troopers captured an escaping criminal with the proceeds of a robbery in his possession, no doubt the newspaper would have expressed editorial appreciation.

There is an old saying "Hindsight is much better than foresight." If the patrolman could be SURE that a speeder is just "Joe Citizen" there would be no need to risk his life. He can "do it" the easy way by turning in the license number. But if there is something about the car or driver which arouses suspicion—the action he should take is his decision. Only he can make the decision and which ever way it be—the press and the citizens should stand behind him for doing his job.

## Random Shots:

We received an interesting letter from D. C. Miller, Editor of the National Prospector's Gazette (a magazine which covers the Mining and Lapidary fields) in which he says "... We subscribe to the belief that occupied minds don't have time to get into trouble and we have never yet heard of a juvenile rockhound (we call them 'Pebblepups' in the mineralogical hobby) getting into any sort of trouble." He further suggests that if a juvenile officer is interested in getting together a "gem and mineral club" for the youngsters of his community, Mr. Miller will assist him by sending a free subscription to the magazine. Address him at Bellflower, Calif.

From the "Hard-to-Believe" Department: A friend of mine operates a movie theater and was in the box office when the phone rang. It was a mother inquiring about—"What's playing"? She was told, and she then asked "Is it all right for my six year old youngster?" The manager, being an honest individual said—"Well—there is a lot of violence—gunplay and murder in the picture" ... He was interrupted by the mother saying—"Oh that's all right as long as it isn't full of sex stuff."

As this copy goes to the printer we are busy counting your votes for the Traffic and Youth Bronze Plaques Award. The winners will hear of their good fortune before January first, but the completed tabulation will be finished too late for us to print in this issue. The final results will be published in February. The fact which we found most interesting was the variety of choice which you readers had. Time of the article publication and location of the activities have little or no bearing on the vote. During the coming year as you read each contest article make a mental rating so when voting time comes again you will have your choice in mind. Incidentally, why don't you write about your programs and send them to us?

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